RESOURCES

OF THE

Southern Fields and Forests,

MEDICAL, ECONOMICAL, AND AGRICULTURAL.

BEING ALSO A

MEDICAL BOTANY OF THE CONFEDERATE STATES;

WITH

PRACTICAL INFORMATION ON THE USEFUL PROPERTIES OF THE TREES, PLANTS AND SHRUBS.

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PREFACE.

MEDICINAL AND USEFUL PLANTS AND TREES OI THE CONFEDERATE STATES—INDIGENOUS AND INTRODUCED.

The following paper is prepared by direction of the Surgeon General, for which purpose the author was released tempora rily from service in the field and hospital.

It is intended as a repertory of scientific and popular knowl edge as regards the medicinal, economical, and useful propertie of the trees, plants, and shrubs found within the limits of th Confederate States, whether employed in the arts, for manufac turing purposes, or in domestic economy, to supply a present a well as a future want. Treating specially of our medicina plants and of the best substitutes for foreign articles of vegeta ble origin, my aim has been to spare no exertions, compatibl with the limits assigned me, to make it applicable as well tc the requirements of the Surgeon as of the Planter and Farmer and I trust that after the war shall have ceased there wil still be no diminution in the desire of every one to possess a source from whence his curiosity may be satisfied on matters pertaining to our useful plants. The Regimental Surgeon ir the field, the Physician in his private practice, or the Planter or his estate may themselves collect and apply these substances within their reach, which are frequently quite as valuable as others obtained from abroad, and either impossible to be pro cured or scarce and costly. But information scattered through a variety of sources must needs be first collected to be availabl in any practical point of view.

I have, therefore, inserted whatever I thought would throw light upon the vegetable productions of the Confederate States

to enable every one to use the ample material within his reach. I have searched through the various catalogues and systematic works on botany, and noticed in almost every instance the habitat and precise locality of plants, that each one may be apprised of the proximity of valuable species.

Catalogues of the trees and plants growing in special localities thus become of great service, as they indicate *precisely* where valuable species may be procured. Those interested may obtain the localities of many plants found in the Confederate States by consulting Elliott's Botany, Darby's, and the recent work by Chapman, of Florida, "The Flora of the Southern United States." Among the catalogues issued at the South are one by Dr. Jno. Bachman of "Plants growing in the vicinity of Charleston," published in the Southern Agriculturist; one by Prof. Louis R. Gibbes of those found in Richland district, S. C.; "Plants found in the vicinity of Newbern, N. C.," by H. B. Croom; an unfinished paper, by W Wragg Smith, Esq., published in the Transactions of the Elliott Society of Charleston; and "A Medico-Botanical Catalogue of the Plants of St. John's, Berkley, S. C.," by the writer. Also my "Sketch of the Medical Botany of South Carolina," published in the Transactions of the Am. Med Association, vol. ii, 1849, and "Resources of the Southern Fields and Forests," De Bow's Review, August, 1861. The extensive collection in the Charleston Museum by my friend, Mr. H. W. Ravenel, as well as the several publications of himself and Mr. M. A. Curtis, of Hillsborough, N. C., might also be consulted with profit. I have availed myself of Dr. Chapman's work in ascertaining the names of plants added by botanists since the time of Walter and Elliott, and not contained in the catalogues referred to. The plants have been arranged after the Natural system, adopting for the most part the views of Lindley

The reference to information contained in books* serves the purpose of showing those interested in any production or manufacture where fuller details, which are too long to insert, can be procured. It will be seen from inspecting the list of author-

*I take this occasion to express my indebtedness to Col. J. B. Moore, of Stateburg, S. C., for the use of a valuable library of agricultural and chemical books, and for many facilities afforded me in the prosecution of this work; also, to Prof. L. R. Gibbes, for the loan of the catalogues in his possession.

ities, that the labor of searching through the large number of medical and other authorities has been very great. I have not hesitated to draw largely from any quarter, appending the name of the author, whenever I thought the matter applicable to our present condition and requirements. Thus, on the subject of the Grape, Vine, Sugar, Sorghum, Tannin, Opium, Flax, ~~Mustard,~~ Castor oil, Oils, Turpentine, Starch, Potash, Soda, Wood for engraving and for domestic purposes, Medicinal substances, etc., I have been profuse in my selections from a multiplicity of sources.

I have avoided more than a cursory mention of the Cryptogamic plants, Fungi, etc., as the space occupied would be too great. I would refer the reader to my paper in the Transactions of the Am. Med. Association, vol. vii, on "The Medicinal, Dietetic, and Poisonous Properties of the Cryptogamic Plants of the United States," where the subject is treated *in extenso*, and a description of several hundred useful or poisonous species furnished.

The older as well as the more recent works on the Materia Medica, Therapeutics, and Medical Botany — from Johannes Ray and Bergius to Pereira, Griffith, and Stillé — have been consulted. That complete and extensive work, the *Dictionnaire de Matière Médicale*, by Mérat and De Lens, including the supplementary volume, has been freely translated when necessary. I have also examined the Agricultural journals, the Patent Office Reports, the "Rural Cyclopædia," edited by Wilson, of Edinburgh, and excerpts from the journals and newspapers of the day, which have since the beginning of the present contest been particularly full in information on the economical resources of our Confederacy From these I have been carefully collecting.

In our present exigency many topics are appropriately introduced which would hardly have place in a strictly medical work.

Information of this kind is generally referred to under subjects with which it is closely allied. Thus, Potash, Ashes, and Soap are classed under "Carya" and "Quercus" (Hickory and Oak), Soda and Soda Soaps under "Salsola" and "Fucus," Charcoal under "Pinus" and "Salix" (Pine and Willow), Oils under "Sesamum" (Bené), Starch and Arrow-root under "Ma-

ranta" and "Convolvulus," etc., as these plants are characteristically rich in such products. The index, however, will contain full references.

The mode of action of medicinal plants infinitely varies; their selection, consequently, for the several purposes required by the physician is not in my opinion a matter of mere accident, the result of guesswork, or of popular reputation. Each is distinguished by the composition of its principal constituents; these are generally astringent principles, narcotics, stimulating vegetable oils, cooling, refrigerant acids, bitter tonics, cathartics, etc., etc. Some, as the Cinchonaceæ and the less active antiperiodics, contain principles still more rarely met with and more obscure in their mode of operation, which have control in warding off the access of malarial attacks. But once in possession of the main active principles furnished by a plant, it is easy to see *why* it gains credit as a remedy in certain classes of disease. This power it may share in common with many others, and several properties may be combined in various degrees in each, which it is necessary to know, preliminary to a judicious application of them. Many plants, for example, are reputed efficacious in arresting the profluviæ, diarrhœas, and discharges from the mucous surfaces generally; this should excite no surprise when it is suspected or ascertained that they contain tannin simply. In some others, as in the *Uva ursi*, for example, the tannin is associated with a stimulating diuretic oil, which further adapts it to the relief of chronic renal affections. So with those which experience teaches us produce a carthartic, emetic, narcotic, sedative, irritant, or vermifuge action on the human system. It is always in virtue of the well known principles they contain that they prove serviceable and are preferred, and chemical analysis subsequently reveals precisely what it is upon which their powers depend. The ignorant, whether credulous or incredulous, know only by *memory* the name of the plant and the disease which it is said to suit—as in the manner of charlatans and herb doctors.

In a notice by my distinguished friend, W Gilmore Simms, Esq., of the article in De Bow's Review, by the writer, published in the Charleston Mercury, Sept. 1861, he speaks thus of the preparations necessary to the great issues then at stake:

"Now is the time when all the art and science that we possess, and all the suggestions that we can make, should be put in requisition, to the great end of our sectional independence. Every citizen who thinks himself in possession of a *truth* or a *fact* which he deems to be not generally recognized, should make it public—put it to challenge—that it may be subjected to investigation. In this way, and this only, with our 'Doubts and Queries,' shall we bring about that searching investigation which will develop our sectional resources."

He refers in discursive language to the "resources of the Southern fields and forests, the natural productions in brief of the South — her resources in the woods, and swamps, and fields, the earth and rocks; for purposes of need, utility, medicine, art, science, and mechanics; hints to the domestic manufacturer; to the workers in wood and earth; and rock and tree; and shrub and flower; hints, clues, suggestions, which may be turned to the most useful purposes; not merely as *expedients* during the pressure of war and blockade, but continuously, through all time, as affording profit, use, interest, and employment to our people."

From an inspection of the large amount of material embraced in this volume it will be seen that our Southern Flora is extraordinarily rich.

It is the teeming product of every variety of soil and climate, from Maryland to Florida, from Tennessee to Texas. The Atlantic slopes with their marine growth, the Mountain ridges of the interior, the almost infra-tropical productions of South Florida, with the rich alluvia of the River courses—all contribute to swell the lists and produce a wonderful exuberance of vegetation. These a bounteous Providence has vouchsafed to a Confederacy of States, starting forth upon their career under new and happier auspices, and with independence and self-reliance forced upon them by an almost sacred necessity.

I here introduce a notice of upwards of four hundred substances, possessing every variety of useful quality. Some will be rejected as useless, others may be found upon closer examination to be still more valuable. The most precious of all Textile Fibres, and Grains, Silks, Seeds, Oils, Gums, Caoutchouc, Resins, Dyes, Fecula, Albumen, Sugar, Vegetable Acids, Starch, Liquors, Spirit, Burning Fluid, material for making

Paper and Cordage, Barks, Medicines, Wood for Tanning and the production of Chemical Agencies, for Timber, Ship-building, Engraving, Furniture, Implements and Utensils of every description—all abound in the greatest munificence, and need but the arm of the authorities or the energy and enterprise of the private citizen to be made sources of utility, profit, or beauty.

ALPHABETICAL INDEX

TO THE

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Bulliard, Histoire des Plantes Vénéneuses de la France. 4 vols. Paris, 1774.	Bull. Plantes Vén. de France.
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Linnæus, Vegetable Mat. Medica. Translated by C. Whitlaw.	Linn. Veg. M. Med.
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Plantæ Rariores Hibernia Inventæ, etc. With Remarks on the Properties and Uses. By Walter Wade, M. D. M. L. S. Dublin, 1804.	Wade's Pl. Rariores.
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New Med. Discoveries, 2 vols. London, 1829. By C. Whitlaw.	Whitlaw's New Med. Disc.
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Flora Scotica. By John Lightfoot. Edinburgh.	Fl. Scotica.
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A New Family Herbal: or, an Account of Plants and their Properties in Medicine and the Arts. By R. J. Thornton. London, 1810.	Thornton's Fam. Herb.
Lindley's Natural System of Botany. With the Uses of Important Species in Medicine, the Arts, and Domestic Economy. London, 1836.	Lind. Nat. Syst. Bot.
Medical Botany. By W. Woodville, 4 vols. London, 1790. Sec. edition, 1800.	Woodv. Med. Bot.
Barton's Med. Botany.	Bart. M. Bot.
W. P. Barton's Flora. Philadelphia, 1823.	Bart. Flora.
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Bigelow's Am. Medical Botany, 4 vols. Boston, 1820.	Big. Am. Med. Bot.
Barton's Collection towards the Formation of a Materia Medica.	Barton's Collec.

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Shecut's Flora Carolinaeensis: or, a History, Medical and Economical, of the Vegetable Kingdom. Charleston, 1806.	Shec. Flora Carol.
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Drayton's View of South Carolina. Charleston, 1802.	Drayton's View.
Chalmer's History of South Carolina.	Chalmer's Hist. S.C.
Garden's and Lining's Observations, Physical and Literary.	Gard. and Lin. Obs.
Travels in South and North Carolina. By John Lawson, Surveyor-General, 1716.	Lawson's S. C.
United States Dispensatory. By Wood and Bache. Philadelphia, 1847.	U. S. Disp.
Thacher's United States Dispensatory.	Thacher's U.S. Disp.
American Dispensatory. By R. Coxe.	Coxe, Am. Disp.
Bergii Materia Medica. E. regno vegetabili, etc.—Stockholmiæ, 1782.	Bergii, Mat. Med.
Cullen's Materia Medica. Edinburgh.	Cullen, Mat. Med.
Lewis' Materia Medica, 2 vols. London, 1791.	Le. Mat. Med.
Pereira's Materia Medica and Therapeutics, 2 vols.	Pe. Mat. Med. and Therap.
Practical Dictionary of Materia Medica. By John Bell. Philadelphia.	Bell's Pract. Dict.
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Edwards and Vavasseur's Matière Medicale. Paris, 1836.	Ed. and Vav. Mat. Méd.
Trousseau et Pidoux, Traité de Thérapeutique, et de Matière Médicale. Paris, 1837.	Trous. et Pid. Mat. Méd.
Elements of Materia Medica and Therapeutics. By H. R. Frost, Prof. M. M. South Carolina Medical College.	Frost's Elems. Mat. Med.
Chapman's Therapeutics and Materia Medica, 2 vols. Philadelphia, 1822.	Chap. Therap. and Mat. Med.
Ballod and Garrod's Materia Medica. London, 1846.	Ball. and Gar. Mat. Med.
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Mérat and de Len's Dictionnaire Univ. de Matière Médicale. Paris, 1837, tom. vi.	Mer. and de L. Dict. de M. Méd.
Supplementary volume to the above. Paris, 1846.	Supplem. to Dict. Univ. de M. Med.
Watson's Practice of Physic. Second American Edition. Philadelphia, 1845.	Watson's Pract. Physic.
Southern Agriculturist. Charleston, 1820, '39.	So. Agricult.
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Flora of the Southern United States, containing abridged descriptions of the flowering plants and ferns of Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, and Florida, arranged according to the natural system, by A. W. Chapman, M. D. The ferns by Daniel C. Eaton. New York, 1860.

Rural Economy, in its relations with chemistry, physics, and meteorology, or chemistry applied to agriculture, by J. B. Boussingault, member of Institute of France, etc. Translated by George Law, Agriculturist. New York, C. M. Saxton, 1857.

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Enquire Within; 3,700 facts. New York, 1857.

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Industrial Resources of the South and West, by J. D. B. DeBow. New Orleans, 1853.

Sorgho and Imphee, the Chinese and African Sugar Canes, by H. S. Olcott. New York, 1857.

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A Muck Manual, by Samuel L. Dana. New York, 1858.

The Fruit Garden. A Treatise by P. Barry. New York, 1857.

Practical Treatise on Culture of Grape, by J. Fiske Allen. New York, 1858.

Charlton on Culture of Exotic Grape under Glass. New York, 1853.

Elements of Scientific Agriculture, by S. P. Norton, Professor in Yale College, New York, 1854.

A Manual of Scientific and Practical Agriculture, for the School and the Farm, by J. L. Campbell, A. M., Professor Physical Science, Washington College, Va. Philadelphia, 1859.

The American Grape Grower's Guide, intended especially for the climate of America. Illustrated by William Charlton. New York, A. O. Moore, 1859. For full description of best modes of cultivating the grape.

Sorgho and Imphee, the Chinese and African Sugar Canes. Manufacture of sugar, syrup, alcohol, wines, beer, cider, vinegar, starch, and dye stuffs, with translations of French Pamphlets, etc., etc., and drawing of machinery, by H. S. Olcott. New York, A. O. Moore, 1857.

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Rural Chemistry, by Edward Solly, F. L. S., Honorary Member of Royal Agricultural Society, England. Philadelphia, Henry C. Baird, 1852.

The Rural Cyclopædia, or a General Dictionary of Agriculture, and of the Arts, Sciences, Instruments, and Practice necessary to the Farmer, etc. Edited by Rev. Jno. M. Wilson. In four volumes. Edinburgh, 1852, A. Fullarton.

General Directions for Collecting and Drying Medicinal Substances, with a list of Indigenous Plants. From the Surgeon-General's office, 1862. Richmond. A pamphlet.

The following works, published in England, may be referred to in case any are desirous of consulting them:

Miller's Gardener's Dictionary, Marshall on Planting, Nichols' Planter's Calendar, Pontey's Profitable Planter, Phillips' Shrubbery, Treatise on Planting in the Library of Useful Knowledge, Loudon's Encyclopædia of Plants, Accum on the Adulterations of Food, Babbage on the Economy of Machinery and Manufactures, Thompson's Vegetable Chemistry, Knapp's Technology, Willich's Domestic Encyclopædia. See, also, Treatise by Dr. J. Harris, of Mass., on Insects injurious to Vegetation, and Townsend Glover's papers on same subject in Patent Office Reports.

☞ Those interested in obtaining foreign seeds, plants, etc., can obtain them by applying to James Carter & Co., and Butler & McCulloch, of London; William Thompson, of Ipswich, England: and Vilmorin, Andreux & Cie., Paris, France.

INTRODUCTION.

GENERAL DIRECTIONS

FOR

COLLECTING AND DRYING MEDICINAL SUBSTANCES OF THE VEGETABLE KINGDOM.

DIRECTIONS FOR COLLECTING.

All leaves, flowers, and herbs should be preferably gathered in clear, dry weather, in the morning, after the dew is exhaled.

The roots of medicinal plants, although more advantageously gathered at certain periods, to be hereafter specified, do not lose their medicinal virtues in consequence of being dug in mid-summer. It is probable that most of those imported are thus collected by savages or ignorant persons, when the plant is in full leaf, it being then more easily recognized.

Plants, Annual, should be gathered at the time when their vegetation is most vigorous, which is generally from the time they begin to flower until their leaves begin to change.

Plants, Biennial, should, in most instances, be gathered in the second season of their growth, and about the time of flowering.

Roots of Annuals are to be gathered just before the time of flowering.

Roots of Biennials are to be gathered after the vegetation of the first year has ceased.

ROOTS OF PERENNIALS are to be gathered in the spring, before vegetation has commenced. Roots should be washed, and the smaller fibres, unless they are the part employed, should be then separated from the body of the root, which, when of any considerable size, is to be cut in slices previous to being dried.

BULBS are to be gathered after the new bulb is perfected, and before it has begun to vegetate, which is at the time the leaves decay. Those which are to be preserved fresh should be buried in dry sand.

BARKS, whether of the root, trunk, or branches, should be gathered in the autumn, or early in the spring. The dead epidermis or outer bark, and the decayed parts, should be removed. Of some trees (as the elm) the inner bark only is preserved.

LEAVES are to be gathered after their full development, before the fading of the flowers. The leaves of biennials do not attain their perfect qualities until the second year.

FLOWERS should, in general, be gathered at the time of their expansion, before or immediately after they have fully opened; some—as the Rosa Gallica—while in bud.

AROMATIC HERBS are to be gathered when in flower.

STALKS AND TWIGS should be collected in autumn.

SEEDS should be collected at the period of their full maturity

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DIRECTIONS FOR DRYING.

Medicinal products of the vegetable kingdom (as plants, roots, etc.) should be dried as rapidly as is consistent with their perfect preservation, but not subjected to extreme heat.

Those collected in the warm months and during dry weather may, except in a few instances, be dried by their spontaneous

evaporation, in a well ventilated apartment; some — as roots and barks—may be exposed to the direct rays of the sun.

In spring and autumn, and in damp, foggy, or rainy weather, a drying-house should be resorted to; the temperature to range from 70° to 100° F. There should be an aperture above for the escape of warm, moist air

FIBROUS ROOTS may be dried in the sun, or at a heat of from 65° to 80° F in the drying-room.

FLESHY ROOTS should be cut in transverse slices, not exceeding half an inch in length, and during the drying process should be stirred several times to prevent their moulding.

BULBS must have the coarse outer membrane peeled off. In other respects they are to be treated like fleshy roots.

BARKS, WOODS and TWIGS readily dry, in thin layers, in the open air.

LEAVES, after separation from the stalks, should be strewed loosely over hurdle-frames, and their position changed twice a day, until they become dry When very succulent, they require more care to prevent their discoloration. For thin, dry leaves, the heat need not exceed 70° F; for the succulent, it may gradually be raised to 100° F

ANNUAL PLANTS AND TOPS.—If not too juicy, these may be tied loosely in small bundles, and strung on lines stretched across the drying-room.

FLOWERS must be dried carefully and rapidly, so as to preserve their color. They should be spread loosely on the hurdles, and turned several times by stirring. When flowers or leaves owe their virtues to volatile oils, greater care is necessary

A carefully pressed specimen of the stem, leaf, and flower of each medicinal substance collected, whether it be bark, root, or

herb, should be obtained and forwarded with each collection, for the purpose of aiding in its identification. From "General Directions" and List of Plants—a pamphlet issued from Surgeon-General's Office, 1862. Consult, also, U. S. Dispensatory.

The two following papers, contributed by the writer to a periodical during the present war, are introduced before entering upon the systematic portion of the work, because they contain information, in a condensed shape, which may be practically useful:

BRIEF NOTICE OF EASILY PROCURABLE MEDICINAL PLANTS, TO BE COLLECTED BY SOLDIERS WHILE IN SERVICE IN ANY PART OF THE CONFEDERATE STATES.

My attention having been occupied with the subject of the substitutes for imported Medicines, I have thought that if some hints were given the Surgeons and Assistant Surgeons in the field, with respect to the useful properties of a few articles (easily attainable in every part of the country), it would greatly lessen the use of the more expensive medicines. One man detailed from each company, or from a regiment, could obtain a full supply of each substance fresh, for the use of the Surgeon, and this at less trouble and expense than if it was procured by the Medical Purveyors, to be distributed to the regiments. I will mention some of these substances. They are familiar to all, but still, without special recommendation, they are likely to escape attention:

Sassafras (*Laurus*).—Whilst engaged in active duties as Surgeon to the Holcombe Legion, whenever a soldier suffered from measles, pneumonia, bronchitis, or cold, his companion or nurse was directed to procure the roots and leaves of Sassafras, and a tea made with this supplied that of Flax Seed or Gum Arabic. Each leaf of Sassafras contains a great amount of mucilage.

Bené (*Sesamum*).—The planters and farmers throughout the Confederate States should save and cure all the leaves of the

Bené now growing, to be used in camp dysentery, in colds, coughs, etc., among our soldiers, in place of Gum Arabic or Flax Seed. One or two leaves in a tumbler of water imparts their mucilaginous properties.

Dogwood (*Cornus Florida*).—Since the war, the bark has been employed with great advantage in place of quinine in fevers—by physicians in Sumter district, S. C., and elsewhere—particularly in cases of low forms of fever, and in dysentery, on the river courses, of a typhoid character. It is given as a substitute for Peruvian barks. In fact, in almost any case where the Cinchona bark was used.

Thoroughwort, Bone-set (*Eupatorium perfoliatum*).—Thoroughwort, drank hot during the cold stage of fever, and cold as a tonic and antiperiodic, is thought by many physicians to be even superior to the Dogwood, Willow, or Poplar, as a substitute for quinine. It is quite sufficient in the management of many of the malarial fevers that will prevail among our troops during the summer; and if it does not supply entirely the place of quinine, will certainly lessen the need for its use. These plants can be easily procured in every locality

Tulip Bearing Poplar (*Liriodendron*) and the *Willow* bark supply a remedy for the fevers met with in camp. Cold infusion given.

Sweet Gum (*Liquidambar Styraciflua*).—The inner bark contains an astringent, *gummy* substance. If it is boiled in milk, or a tea made with water, its astringency is so great that it will easily check diarrhœa, and associated with the use of other remedies, dysentery also. The leaf of the gum when green I have also ascertained to be powerfully astringent, and to contain as large a proportion of tannin as that of any other tree. I believe that the Gum leaf and the leaf of the Myrtle and Blackberry can be used wherever an astringent is required; cold water takes it up. They can, I think, be also used for tanning leather, when green, in place of oak bark.

Blackberry Root (*Rubus*).—Wherever it can be obtained, a

decoction will check profuse diarrhœas of any kind. The root of the Chinquapin (*Castanea*) is also astringent.

Gentian.—Our native tonics are abundant. Several varieties of *Gentian*, *Sabbatia*, etc., may be added to those mentioned. The *Pipsissewa*. or Winter Green (*Chimaphila*), is both an aromatic tonic and a diuretic, and therefore selected in the convalescence from low fevers followed by dropsical symptoms. These, the numerous aromatic plants, etc., are not intended to take the place of mercury, or any other drug which can be obtained and is required. It is not intended that a blind or exclusive reliance should be placed in them — but they are recommended to supply a great and present need.

Holly (*Ilex Opaca*).—The bark of the holly root chewed, or a tea made with it, yields an excellent bitter demulcent, very useful in coughs, colds, etc. The bitter principle is also tonic. The Holly contains bird-lime.

Wild Jalap (*Podophyllum Peltatum*).—If this can be found it can be used as a laxative in place of rhubarb or jalap, or wherever a purgative is required. Every planter in the Confederate States can produce the opium, mustard, and flax seed that is required, either for the army or for home use.

I think we stand most in need also of nitrate, chlorate, and bicarb. of potash, as we have no means of supplying these by vegetable substances. It has suggested itself to me that those in charge of our Nitre works might also produce other preparations of potash with very little additional trouble.

Potash, pearlash, and soda are easily procurable from the ashes of certain plants. Our *Salsola Kali*, growing on the sea coast, is rich in soda. Consult index for references to more detailed information.

SOUTHERN TREES ADAPTED TO THE PURPOSES OF THE MANUFACTURER AND WOOD ENGRAVER.

A short time since, in answer to an inquiry of a correspondent, I gave the names of several trees growing at the South as probably suited for the purposes of the wood engraver. To these I will now add those noticed by subsequent correspondents, and also call attention to two or three other trees with wood of great fineness and density of structure, which may be tested as substitutes for the wood heretofore imported from the North; and which are also likely to prove serviceable whenever a wood of hard, fine grain is required by the manufacturer.

Iron Wood, Horn Beam (*Ostrya Virginica, Ell. Sk.*)—It has often been employed by turners, and wrought into mill-cogs, wheels, etc. The wood is tough and white, and will prove an important acquisition to those interested in machinery, or in the construction of implements, tools, etc.

White Beech (*Fagus Sylvatica*). Diffused. This wood is very hard, is capable of receiving a high polish, and should be prized by cabinet makers and turners for manufacturing purposes.

Sweet Birch, Cherry Birch, Mountain Mahogany (*Betula Lenta, Linn.*)—Grows in mountains of South Carolina, possesses a fine grain, and also susceptible of a beautiful polish. The Red Birch (*Betula Nigra*) grows in our swamps in the lower country. The Black Birch is said by Lindley to be exceedingly hard.

White Oak (*Quercus Alba*).—One of the best of the Oaks, with the Live Oak, likely to be employed wherever great durability is desirable; these, with the Walnut and Maple, are well known.

Dog Wood (*Cornus Florida*).—Much used on our plantations wherever a wood of firmness of texture is required.

Persimmon (*Diospyros Virginiana*).—A very hard wood—in the natural family of plants found under what is known as the *Ebony* tribe.

The *Holly* (*Ilex Opaca*), the Apple, and Pear are very much esteemed by many; perhaps harder than any of those cited. These may be more particularly adapted to the purposes of the wood engraver.

The *Calico Bush*, *Ivy Bush* (*Kalmia Latifolia*).—Grows in our middle districts. Wood hard and dense.

Mountain Laurel Bay (*Rhododendron Maximum*).—Found in our mountains; said to resemble the Kalmia, and quoted by a writer as adapted to the purposes of the engraver.

Iron Wood.—Another tree named from its supposed firmness (*Bumelia Lycioides Ell. Sk.*) I have collected it in Charleston, and forty miles from the ocean.

Yellow Locust Tree, *False Acacia* (*Robinia Pseudoaccaciæ, L.*)—In mountains and in lower districts. The grain is fine and compact; the wood, on account of its durability, is much used for treenails in ship building.

Leather Wood (*Dirca Palustris*).—Grows in Georgia; is both hard and pliant.

Arbor Vitæ (*Thuja occidentalis*).—Grows in mountains. Wood said by Michaux to be the most durable which our forests produce.

The *soft* woods are: the Cedar, the Cypress, the Black Spruce, or Fir (*Pinus nigra*, Aiton); the *Pinus strobus* (growing in the mountains), and the Spruce tree of our low country swamps, which might well supply the place of our Northern pine. All these, with the Willow (*Salix nigra*), are used for the timbers and spars of boats. The last is both soft and durable. Mr. Elliott says, in his Sketch of the Botany of South Carolina, that the wood of the Red Mulberry (*Morus rubra*) is preferred in the building of boats to that of any other, except the Red Cedar.

The wood of the Black Gum (*Nyssa aquatica*), particularly the portion near the ground, is peculiarly white, spongy, and light. It has great elasticity, and a specific gravity almost low enough to adapt it, in the opinion of the writer, to be used as a substitute for the bark of the Cork tree.

The Poplar is well known also for its qualities of softness and lightness. The Maple less so. The Pride of India is light and durable, and susceptible of polish, with a pretty grain under varnish, adapting it to purposes of the manufacturer. But these do not resist water when submerged, as do the softer woods first mentioned, viz: the Cypress, Cedar, or the Palmetto, which is characteristically soft, porous, and elastic.

RESOURCES

OF THE

SOUTHERN FIELDS AND FORESTS,

MEDICAL, ECONOMICAL, AND AGRICULTURAL.

CLASS I. EXOGENS: OR, DICOTYLEDONOUS

FLOWERING PLANTS.

SUB-CLASS I. POLYPETALÆ.

NATURAL ORDERS.

RANUNCULACEÆ. (*Crow-Foot Tribe.*)

The plants belonging to this order are generally acrid, caustic, and poisonous. It contains some species, however, which are innocuous. The caustic principle is volatile, and neither acid nor alkaline.

Clematis crispa, Linn. Not of Ell. Sk., which is the C. cylindrica, T. and Gray. Grows in damp, rich soils, and in swamps in the low country of South Carolina, vicinity of Charleston. Dr. Bachman. Newbern, Croom. Fl. May.

Mér. and de L. Dict. de M. Méd. ii, 311; U. S. Disp. 1244; Shec. Flora Carol. 418. This plant is substituted for the C. erecta, mentioned by Storck, and is employed in secondary syphilis, ulcers, porrigo, etc.; given internally,

with the powdered leaves applied to the sore. It acts also as a diaphoretic and diuretic. Mérat says it possesses the properties of the C. vitalba, which is a dangerous vegetable caustic, used as a substitute for cantharides, and applied to rheumatic limbs, and in paralysis and gout. The decoction of the root is alterative and purgative; and is also said to be valuable in washing sores and ulcers, in order to change the mode of their vitality, and to make them cicatrize. Shecut remarks that "the Spanish or blistering flies are very fond of the Clematis crispa, and it would be well for medical gentlemen in the country to propagate the plant about their residences, in order to secure a constant succession of these valuable insects." See Potato, "Convolvulus." The American species are deserving of particular attention, and we would invite further investigation of them.

Clematis viorna. L. Traveller's-joy. Grows in middle and upper districts. Elliott. Fl. July.

Shec. Flora Carol. 489; Griffith's Med. Bot. 86; U. S. Disp. 1244. This, and the following, have also a caustic property, and are employed internally as diuretics and sudorifics in chronic rheumatism; and externally, in the treatment of eruptions, and as vesicants. Shecut says that a yellow dye may be extracted from both leaves and branches: the latter are sufficiently tough to make withs and fagots. The fibrous shoots may be converted into paper, and the wood is yellow, compact, and odoriferous, furnishing an excellent material for veneering.

Clematis Virginiana, Linn. Virgin's bower. Grows in rich soils; vicinity of Charleston. Fl. July. Wood and Bache, U. S. Disp. 1244; Griffith, Med. Bot. 80. See C. viorna.

Anemone nemorosa, L. } Wood Anemone. Mountains
Ranunculus phragmites. } of South Carolina. Fl. April.

Bull. Plantes Vén. de France; Linn. Veg. M. Med. 109; Fl. Scotica, 287: Chomel, Plantes Usuelles, ii, 376; Dict.

des Sc. Méd. lxv, 194; Mér. and de L. Dict. de M. Méd. i, 292; U. S. Disp. 1228. It is said to be extremely acrid—even small doses producing a great disturbance of the stomach; employed as a rubefacient in fevers, gout, and rheumatism, and as a vesicatory in removing corns from the feet. It is reported to have proved a speedy cure for tinea capitis, and the flowers have been used in violent headaches; Linnæus says that the plant produces a discharge of urine, attended with dysentery, in cattle which feed on it. It contains a principle called anemonin.

Most of the species of Anemone, says Wilson, Rural Cyc., are acrimonious and detersive. "An infusion of Anemone is said to remove woman's obstructions, and to increase her milk; the bulbous roots when chewed are said to strengthen the gums and preserve the teeth; a decoction of the roots is said to cleanse corrosive ulcers, and heal inflammation in the eyes; the flowers, boiled in oil, are said to have the property of thickening the hair, and Anemone ointment is said to be a good eye-salve, and a useful application to ulcers and external inflammations," all which I introduce for what it may be worth; no doubt the oil furnished by it imparts some property to the plant, and, like tannin in all the astringent plants, accounts for the slight medicinal effect which results from their use. An improved knowledge will, one day, determine the exact position in value of the whole vegetable kingdom, but for a while we must be contented with the publication of much that is vague and uncertain. The unexpected discoveries of Ipecacuanha, Cinchona, Veratrum viride, etc., warn us not to discard, upon a superficial examination, all those popularly considered as of trivial importance.

Hepatica triloba, Chaix. } Liverwort. Grows in light *Anemone hepatica*, Linn. } soils, upper districts, and in Georgia. Collected by Mr. Ravenel at the Eutaw battle-ground, St. John's, Berkley; sent to me also from Abbeville district.

U. S. Disp. 368; Raf. Med. Fl. i, 238; Lind. Nat. Syst.

81. A tonic and astringent, supposed by some to possess deobstruent virtues. It has been used to a considerable extent in hæmoptysis and chronic cough; but Wood says it has fallen into neglect.

Hydrastis Canadensis, W Orange-root; yellow-root; turmeric; golden seal. Grows in rich soils, among the mountains of South Carolina. Fl. May.

Lind. Nat. Syst. 6; Bart. M. Bot. ii, 21; Veg. Mat. Med. ii, 17; Raf. Med. Fl. i, 251; Griffith, Med. Bot. 82. It has a narcotic smell; used in this country as a tonic. The root was known to the Indians, from the brilliant yellow color which it yields. This appears to be permanent, and might be applied in the arts. Martin, in the Trans. Phil. Soc. 1783, in his Observations on the Dyes used by the Aborigines, states, from his own experience, that it was found serviceable in coloring silks, wool, and linen. With indigo, it yielded a rich green. Griffith mentions it as a powerful bitter tonic, much used in the West as a wash in chronic ophthalmia. In its fresh state, supposed to be narcotic. Tincture, decoction, or powder employed. Dose of powder, thirty to sixty grains.

Caltha palustris, L. *Var. parnassifolia*, T. & G. Cedar Swamps, S. C., (Pursh); Chap. Flora. The flower buds are pickled for use as a substitute for capers.

Ranunculus sceleratus, L. T. and Gray. Grows in bogs; abundant around Charleston. Newbern, Croom. Fl. May.

Bull. Plantes Vén. de France, 143; Dém. Élém de Bot.; Lightfoot's Fl. Scotica, 295; U. S. Disp. 584; Mér. and de L. Dict. de M. Méd, 620, and the Supplem. 1846, 620; Dioscorides, lib. vi, c. iv; Orfila, Toxicol. Gén. ii, 90; Big. Am. Med. Bot. iii, 65; Griffith, Med. Bot. 84.

The juice possesses remarkable caustic powers, raising a blister if applied topically, and often in doses of two drops exciting fatal inflammation along the whole tract of the alimentary canal. Some, however, say that this property is

not constant, as it is of a volatile nature, and is dissipated by heat. According to Mérat, the Bedouins use it as a rubefacient, and it is applied in sciatica, forming a substitute for cantharides. Annal. Univ. de Méd. 1843. It has been administered with success in asthma, icterus, dysuria, rheumatism, pneumonia, and fixed pains. When it acts as a vesicant, it has not the disadvantage of producing strangury. Bigelow says the volatile principle may be collected by distillation, and preserved in closely-stopped bottles. Tilebein relates that the distilled water is excessively acrid, and on cooling, deposits crystals, which are almost insoluble in any menstruum. Precipitates are caused by muriate of tin and acetate of lead. The boiled root may be eaten.

Ranunculus repens, Linn. }
Nitidus, Ell. Sk. } Grows in shady woods, and among the mountains of this state. Fl. Aug.

U. S. Disp. 584. This has also a rubefacient and epispastic operation. Big. Am. Med. Bot. iii, 65. Very similar to the above in its mode of action.

Delphinium consolida, L. Larkspur. Becoming naturalized. The plant has astringent properties, and its flowers yield a fine blue dye.

Cimicifuga racemosa, Torrey. }
Actæa racemosa, L. & Willd. } Black snake-root; Cohosh; grows in the upper districts, and in Georgia. Fl. July.

Linnæus, Veg. Mat. Med. 102 (see Actæa). The root is used in the debility of females attendant upon uterine disorder; and, in its action, is thought to have a special affinity for this organ. It has also a decided effect upon some nervous affections, especially chorea. See Journal Phil. Coll. Pharm. vi, 20, and Dr. Young's notice of it in the Am. Journal Med. Sc. v, 310. "We have administered this medicine in chorea with complete success, after the failure of purgatives and metallic tonics; and have also

derived the happiest effects from it in cases of convulsions recurring periodically, and connected with uterine disorder." Wood, U. S. Disp. The powdered root is employed, a teaspoonful three times a day. It is a stimulating tonic, increasing the secretion of the skin, kidneys, and lungs. Mérat, in the Dict. de Mat. Méd., adds the authority of Dr. Kirkbride in support of the efficacy of this plant in chorea, who advises that a purgative be premised, when it may be given for several days, and then discontinued, to be resumed again; frictions should at the same time be made upon the surface with the tinct. See the Supplem. 1846, to the Dict. de. M. Méd. cit. sup. Dr. Hildreth has found this plant, in combination with iodine, very advantageous in the early stages of phthisis. Am. Journal Med. Sc. Oct. 1842. The decoction is the most useful form; one ounce of the bruised root is boiled in a pint of water, of which a half pint to one pint may be taken during the day. Dr. Physick also had known it to cure cases of chorea; and Mérat and de L., in the 1st vol. of op. cit. p. 67 (see Actæa), say that it partakes of the properties of A. brachipetala. According to Chapman, it produces free nausea, with abundant expectoration, succeeded by nervous trembling, vertigo, and a remarkable slowness of the pulse. Dr. Garden administered the tincture for phthisis. London Med. Journal, li, 245. Barton employed it as an astringent, which property it owes to the gallic acid it contains. He also gave it in putrid sore throat. In New Jersey, a decoction of the root is said to cure itch; and in North Carolina, it is given as a drench for cattle, in the disease called murrain. Shec. Flora Carol. 91; Carson's Illust. Med. Bot. i, p. 9, 1847. See Annal. in Am. Journal Pharm. vi, 20, 1843. According to Mr. Tilghman, it contains gum; starch; sugar; resin; wax; tannin; gallic acid; salts of potassa; lime; magnesia; iron, etc. The ethereal extract contains most of its virtues. See, also, Jones, in the Journal de Pharm. x, 670; and Journal Phil. Coll. Pharm. vi, 14; Griffith, Med. Bot. 92. He remarks that its greatest efficacy has been exhibited in rheumatism; the power of

the root appearing to depend on the volatile oil and bitter resin, both of which are soluble in alcohol, and partially so in water.

Zanthorrhiza apiifolia, L'Her. Yellow root. Upper, and mountainous districts. Fl. April.

U. S. Disp. 745; Bart. Med. Bot. ii, 203; New York Med. Repos. 291; Lind. Nat. Syst. 6; Griffith, Med. Bot. 95; Elliott's Bot. Med. note i, 376: Stokes, Med. Bot. ii, 194.

The bark possesses pure bitter tonic properties, closely analogous to those of colombo and quassia. Dr. P C. Barton thinks it a more powerful bitter than the former of these. It was given by Dr. Woodhouse in doses of forty grains in dyspepsia; a decoction is also employed. The shrub contains a gum and resin, both of which are intensely bitter. Alcohol is the best menstruum. Its tinctorial powers were known to the Indians. It yields plentifully a coloring matter, a drab being imparted by it to wool, and a rich yellow to silk; without a mordant it does not affect cotton or linen: with Prussian blue it strikes a dull olive green color.

Jeffersonia diphylla, Pers. Twin-leaf. Rich shady woods, Tennessee.

The decoction of this plant is used by the vegetable practitioners and Indian doctors as a diuretic in dropsy, and as an external application to sores, ulcers, etc.

Podophyllum peltatum, L. Wild jalap; May-apple; wild lemon; duck-weed. Diffused in rich swamp lands; grows in Abbeville and Sumter districts; collected in St. John's, Berkley; vicinity of Charleston, Bach.; Newbern. I saw it at Portsmouth, Virginia. Fl. March.

Pe. Mat. Med. ii, 749; Bell's Pract. Dict.; Drayton's View S. C. 73; Royle, Mat. Med. 573; Frost's Elems. 137; Eb. Mat. Med. i, 205; Ed. and Vav. Mat. Méd. i, 514; U. S. Disp. 556; Big. Am. Med. Bot. ii, 34; Bart. Med. Bot.

i, 9; Journal Phil. Coll. Pharm. iii, 873; Med. Record, iii, 332; Ball and Gar. Mat. Med. 193; Schoepf, M. M. 86; Mér. and de L. Dict. de Mat. Méd. v. 207; Chap. Mat. Med. and Therap. 209; Coxe, Am. Disp. 478; Lind. Nat. Syst. Bot.

Bigelow says it is a sure and active cathartic: "We hardly know any native plant that answers better the common purposes of jalap, aloes, and rhubarb." The Shakers prepare an extract, which is much esteemed as a mild cathartic. By the experiments of Dr. Burgon, in the Am. Med. Recorder, it is useful in combination with calomel; ten grains of the latter with twenty of the podophyllum. In bilious affections it usually supersedes the necessity of an emetic previous to a cathartic; and by this means two desirable effects are produced by one agent. Big. Appendix, iii, 187; Griffith, Med. Bot. 116. It has been recommended in dropsy, from the abundant evacuations which it produces. According to Staples, it contains resin and starch; and Dr. Hodgson has given the name podophylline to the peculiar substance it contains. See Journal Phil. Coll. Pharm.; Carson's Illust. of Med. Botany, pt. i. An officinal extract is prepared, given in doses of 5–15 grains. The leaves are purgative, and sometimes produce nausea in irritable stomachs; the fruit is eatable. It was employed by the Cherokees as an anthelmintic; a few drops poured into the ear are said to restore the power of hearing. The plant has also been found to afford speedy relief in incontinence of urine. Dr. McBride made great use of it during his practice in St. John's, Berkley, S. C.; he said that it answers all the purposes of the officinal jalap, "producing copious liquid discharges, with no griping" The powdered root is applied as a dressing for ulcers; it is said to restrain excessive granulations, sprinkled over the surface. In a communication from Dr. Douglass, of Chester district, S. C., his correspondent, Mr. McKeown, considers the root too drastic as a purge; he adds that the powdered root, mixed with equal parts of resin, acts as a powerful caustic, and is used by farriers for escharotic purposes. We have em-

ployed this plant among negroes as a substitute for jalap and the ordinary cathartics, and find that it answers every purpose, being easily prepared by the person having charge of them. Thirty grains of the root in substance were given, or an infusion of one ounce in a pint of water, of which a wineglassful three times a day is the dose; employing the Liriodendron tulipifera as a substitute for quinine during the stage of intermission of all mild cases of intermittent fever. We would invite the particular attention of planters to the extensive use of these medicines upon their plantations. We have caused them to be used on one on which upward of a hundred negroes resided, and we found that during a period of seven months, including the warm months of summer, they were used in all cases, and apparently fulfilled every indication. No detailed statement of these could be obtained, as it was administered by one of their own number; but large quantities of them were required. The soft pulp contained within the rind of the fruit has a very peculiar musky taste, which is relished by many persons. The pulp is squeezed into a wineglass, and with the addition of a little old Madeira and sugar, it is said to be equal to the luscious golden granadilla of the tropics. Am. Farmer, vol. 14; Farmer's Encyc.

PAPAVERACEÆ. (*The Poppy Tribe.*)

Narcotic properties generally prevail throughout this order. Seeds are universally oily—seldom narcotic. Europe is the principal seat of the papaveraceæ; but several species included under it are found in North America, beyond the tropic. Most of them are annuals, the perennials being chiefly natives of mountainous tracts.

Papaver Somniferum. Opium Poppy. Thaër, in his Principles of Agriculture, in speaking of the cultivation of the poppy as an oil-bearing plant, says: "The color of the flower is unimportant. The seed is either white or black. Some persons think that the black-seeded variety is more

productive, others give the preference to the white in this respect. The white seed is the more agreeable to the taste, as likewise the oil expressed from it. That variety of poppy is preferred whose heads or capsules when ripe assume a slightly bluish tinge. The structure of the capsules is of more consequence; for there is a variety in which the envelope of the capsule dehisces spontaneously when ripe, so that the seed is easily shed; and another, in which the seed remains enclosed within the capsules, which must be opened in order to extract it." "The poppy may become one of the most profitable crops, if we have the means of disposing of the seed, or if we knew how to extract the oil. By proper cultivation it may be made to produce from nine to ten bushels of seed per acre, and one bushel yields twenty-four pounds of good oil. This oil, especially the first portion, which is cold-pressed, and mixed in the mill with slices of apple, is doubtless the purest kind of oil for the table, and the most agreeable that is known. It is inferior to none, excepting the finest Nice or Lucca oil. It is preferable to the second-rate oil of those places, and the peculiar taste of olive oil may be imparted to it by the addition of a small quantity of that oil of superfine quality." Principles of Agriculture, 457

The oil of the poppy is bland, and not narcotic. "It is used both for food and light, and is considered a fifth more valuable than that of the colza. The cakes remaining after the expression of the oil are valuable for the fattening of swine; and the stalks for fuel. The ashes which remain after burning it are of the best kind of manure. If the seed be pressed in a mill used for the colza, or other oil, the greatest attention must be paid to cleaning it. The oil expressed in cold weather is much superior in quality to that obtained in warm weather, and the two must not be mixed." "Henry Colman's European Agriculture," vol. ii, 538, Boston, 1849. See his "Report on Flemish Agriculture, for method of growing the Poppy, Colza, Flax, Hemp, Hop, Mulberry, Beet, Olive, Grape," etc., also "Thaër's Treatise on Agriculture."

In Thornton's Family Herbal a very full and interesting account can be read of the cultivation of poppy in England, with the successful production of opium in considerable quantity. Forty pounds were made in one season by one person. Boys and girls were employed in incising the bulbs and gathering the gum. See Bené (*Sesamum*) for oils and their expression.

A variety of the "common" or "opium poppy" (*P somniferum*), indigenous to the warm and temperate parts of Europe and Asia, has been introduced, and a brief notice is contained in Patent Office Report, 1855, p. xxi: "It has proved itself susceptible of easy cultivation on very rich soils. It is well adapted to the climate of the Middle and Southern states. The flowers of the 'white poppy' (*Papaver s. alba*), the variety with which the experiment was made, may be either entirely white or red, or may be fringed with purple, rose, or lilac, variegated and edged with the same colors, but never occur blue or yellow, nor mixed with these colors, each petal being generally marked at the bottom with a black or purple spot. The seeds are black in the plants having purple flowers, and light-colored in those which are white; although the seeds of the latter, when of spontaneous growth, are sometimes black. The largest, heads which are employed for medical or domestic use, are obtained from the single flowered kind, not only for the purpose of extracting opium, but also on account of the bland, esculent oil that is expressed from the seeds, which are simply emulsive, and contain none of the narcotic principle. For the latter purpose, if no other, its culture in this country is worthy of attention. Certainly, it is an object worthy of public encouragement, as the annual amount of opium imported into the United States is valued at upward of $407,000." If this was true some years since, how much more essential to us is its production now (1862), when gum opium and morphine are so very difficult to obtain. Occupied in researches upon these subjects during the month of June, under the order of the Surgeon-General, I was enabled to collect, in a few

days, more than an ounce of gum opium, apparently of very excellent quality, having all the smell and taste of opium (which I have administered to the sick), from specimens of the red poppy found growing in a garden near Stateburgh, S. C. I have little doubt that all we require could be gathered by ladies and children within the Confederate States, if only the slightest attention was paid to cultivating the plants in our gardens. It thrives well, and bears abundantly. It is not generally known that the gum which hardens after incising the capsules is then ready for use, and may be prescribed as gum opium, or laudanum and paregoric may be made from it, with alcohol or whisky.

The poppy, it is said, produces better when planted in the fall.

I quote the following from paper cited above:

The successful cultivation of the plant, however, requires the provision of good soil, appropriate manure, and careful management. The strength of the juice, according to Dr. Butler, of British India, depends much upon the quantity of moisture of the climate. A deficiency even of dew prevents the proper flow of the peculiar, narcotic, milky juice which abounds in every part of the plant, while an excess, besides washing off this milk, causes additional mischief by separating the soluble from the insoluble parts of this drug. This not only deteriorates its quality, but increases the quantity of moisture, which must afterward be got rid of. The history of the poppy, as well as that of opium—its inspissated juice—are but imperfectly known. The oldest notices of this plant are found in the works of the early Greek physicians, in which mention is also made of the juice; but opium does not appear to have been so generally employed as in modern times, as the notices respecting it would have been numerous and clear. In the manufacture of opium in Persia or India, the juice is partially extracted, together with a considerable quantity of mucilage, by decoction. The liquor is strongly pressed out, suffered to settle, clarified with the whites of eggs, and evaporated to a due consistence—yielding a fifth of the weight of the

heads of extract, which possesses the virtues of opium in a very inferior degree, and is often employed to adulterate the genuine opium. The heads of the poppies are gathered as they ripen; and, as this happens at different periods, there are usually three or four gatherings in a year. The milky juice of the poppy in its more perfect state, which is the case only in warm climates, is extracted by incisions made in the capsules, and simply evaporated into the consistence in which it is known to commerce under the name of opium.

In Turkey, the plants during their growth are carefully watered, and manured if necessary; the watering being more profuse as the period of flowering approaches, and until the heads are half grown, when the operation is discontinued, and the collection of the opium commences. At sunset longitudinal incisions are made upon each half-ripe capsule, not sufficiently deep to penetrate the internal cavity. The night dews favor the exudation of the juice, which is collected in the morning by scraping it from the wounds with a small iron scoop, and depositing the whole in an earthen pot, where it is worked in the sunshine with a wooden spatula, until it acquires a considerable degree of thickness. It is then formed into cakes by the hands, and placed in earthen pans to be further exsiccated, when it is covered with the leaves of the poppy, tobacco, or some other plant.

In obtaining gum opium, the capsules are cut longitudinally only through the skin, though some advise that it should be done from below upward. I find longitudinal incisions the most economical. This is generally done late in the afternoon, the hardened gum being scraped off early next morning. Boys or girls can easily attend to this. If the capsules are cut only on one side, the same operation may be repeated on the other side, and a fresh supply of opium obtained. A knife with three or four edges, cutting about the twelfth or fourteenth part of an inch, is sometimes used. If the incision is too deep the juice passes within the poppy head.

Prof. Alston, of Edinburgh, long ago, says Thornton, ascertained that opium of good quality could be obtained in Great Britain, "having all the color, consistence, taste, smell, faculties, phenomena," etc., of opium. It has been calculated by Mr. Ball that more than fifty pounds of opium may be collected from one statute acre. Mr. Jones, in 1794, in the county of Middlesex, England, presented twenty-five pounds of opium to the Society of Arts, made by himself, which was ascertained, by chemical examination, to be equal to the imported drug. The reader interested in the culture of the poppy, can find in Thornton's New Family Herbal, p. 516, a pretty full statement of the method of culture, the collection of the gum, etc., employed by Mr. Jones. In Love's report to the Society, he says: "Having a tap root, their size will, consequently, be proportioned to the depth of earth they are enabled to penetrate. Hence the necessity of land that will admit of deep ploughing. The fineness of the surface, too, is very essential. As the seed is small, and the plants on their first coming up so exceedingly tender, the bush harrow should always be used after those which are commonly employed." They should be so cultivated that the gatherer may not disturb the plants in collecting the juice. Mr. Jones is also in favor of autumnal sowing, planting in the month of September, by which means the plants attain sufficient size to endure the cold of winter; these were also found to produce more opium than those planted in March. The scarifications are described, Thornton's Herbal, 517, but any one can devise a knife for the purpose.

Argemone Mexicana, Linn. D. C. Prodrom. Devil's fig; prickly poppy; Mexican poppy; thorn apple; yellow thistle. Charleston district, grows around buildings in rich spots; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. Univ. de M. Méd. i, 395; Journal de Pharmacie xiv, 73; Bull. des. Sci. Méd. de Fér. viii, 210; De Cand. Essai, 116. The oil is said by some to be as active as that of the Croton tiglium; see the Supp. to Mér.

and de L. 1846, 57. In Brazil, the leaves are employed as a cataplasm for driving off ulcers. The infusion is used in Mexico for its marked sudorific powers; the juice is found serviceable in chronic maladies of the skin. In Java, they employ it in inveterate cutaneous diseases, and as a caustic in chancres. Lind., in his Nat. Syst. Bot. 8, says that the seeds are narcotic, and are smoked with tobacco; Gardener's Mag. vi, 315. It is administered in the West Indies as a substitute for ipecacuanha, and the juice of the plant is considered by the native doctors of India as a valuable remedy in ophthalmia, either dropped in the eye or rubbed on the tarsus; it is also considered purgative and deobstruent. Ainslie, M. Med. Ind. 243; Prince Maximil. Travels, 214; Aublet, Hist. Guiane. Mérat, in the Supplem. 1846, says that, in Brazil, in the Isle of France, and in India, the oil is regarded as a purgative, not unlike castor oil, but more active—not, however, being attended with griping; thirty drops were found equivalent to one ounce of castor oil. They applied it in tinea capitis, and as an external application in headache occasioned by exposure to the rays of the sun. See Dr. Schort's examination of it. Dr. Muddie asserts that it induces anodyne effects; so much so, as to relieve, in an instant, the pains of colic. Med. Bot. Soc. London, 1830; Griffith s Med. Bot. 129. The plant abounds in a viscid, milky, acid juice, which, exposed to the air, becomes yellow, resembling gamboge. The flowers are said by De Candolle, Essai, 14, to be employed in Mexico as a hypnotic. A thorough examination of this plant might well repay the labor bestowed upon it. It is, apparently, native in South Florida. Chapman. "Its seeds are said to yield a narcotic substance as powerful as opium. A milky, glutinous juice flows from the whole plant; turns by exposure to the air into a fine bright yellow; and when reduced to the consistence of a firm gum, is not distinguishable from gamboge, and has, we believe, been brought into the market under the name of that drug. It has similar properties to gamboge, both as a medicine and as a pigment; and it has been administered in very small doses

in cases of dropsy, jaundice, cutaneous eruption, and some other diseases." Wilson, Rural Cyc.

I collected a large number of the seeds of this plant near Charleston, and experimented with the oil and tincture, but with no definite results. A long paper on the medical properties of the argemone can be found in the Charleston Medical Journal, among the extracts. I cannot, at present, cite the volume, but it was during the editorial management of Dr. Cain and myself. The tincture was particularly recommended for the relief of colic and pain.

Sanguinaria Canadensis, Linn. Ell. Sk. Puccoon; bloodroot. Diffused; vicinity of Charleston, Abbeville, Richland, and Fairfield districts; collected in St. John's. Fl. March.

Drayton's View of S. C. 72; Bell's Pract. Dict. 404; Eberle, Mat. Med. 95; Lind. Nat. Syst. 8; U. S. Disp. 627; Royle, Mat. Med. 273; Pe. Mat. Med. and Therap. ii, 722; London Med. Chirurg. Trans. vol. i; Bart. M. Bot. i, 30; Ann. Lyceum Nat. Hist. New York, ii, 250; New York Med. and Phys. Journal, i, No. 2; Am. Journal Med. Sci. N. S. ii, 506; Journal Phil. Coll. Pharm. iii, 95; Ball and Gar. Mat. Med. 208; Big. Am. Med. Bot. i, 75; Schoepf, Mat. Med. 85; Barton's Collec. 28; Trans. Lond. Med. Soc. i, 179; Thacher's Disp. 331; Cutler, Mem. Am. Acad. i, 455; Mér. and de L. Dict. de M. Méd. vi, 208; Bull. des Sci. Méd. Fér. vi, 71; Edinb. Med. Journal, vii, 217; Shec. Flora Carol. 153; Carson's Illust. Med. Bot. i, 18, 1847. The root is narcotic, emetic, and purgative in large doses; stimulant, diaphoretic, expectorant, and tonic in small. Dr. Dana found a peculiar principle in it, called sanguinarina (Ann. Lyceum Nat. Hist. New York). According to the experiments of Dr. Donney, of Maryland, in his inaugural thesis, twenty-grain doses of the root induced nausea and vomiting, attended with heat of stomach, acceleration of pulse, and sometimes slight headache; the leaves are said to be endued with similar powers. "The seeds exert a marked influence on the nervous system, occasion-

ing torpor, languor, disordered vision, and dilatation of pupil." Dr. Bard, of New York, confirms this in his Inaug. Diss. It is an acrid narcotic, producing vomiting, and given in all diseases of the mucous membranes; employed in catarrh, typhoid pneumonia, croup, hooping-cough, and in arresting the progress of phthisis, and also in inflammatory rheumatism and jaundice. It was known to Schoepf; and Mérat states that it was serviceable in gonorrhœa. Dr. Israel Allen, of New York, says it acts with all the good effects of digitalis, in affections of the lungs—the infusion being preferred in these, as the tincture does not afford the active principle sufficiently strong; he adds, also, that it powerfully promotes diaphoresis in inflammatory rheumatism. Bigelow mentions it as an acrid narcotic, in small doses lessening the frequency of the pulse, somewhat analogous in its operation to that of digitalis—this, however, being its secondary effect. In still smaller doses, it is a stimulating tonic. The powdered root, snuffed up the nose, is powerfully sternutatory; it is applied as an escharotic to fungous flesh; and several polypi, of the soft kind, were cured by it in the hands of Dr. Smith, of Hanover. Dr. Shanks, of Tennessee, also destroyed a gelatinous polypus with sanguinaria, after extraction had twice failed. Am. Journal Med. Sci. Oct. 1842. The decoction has also been used as a wash to ill-conditioned ulcers. Dr. McBride employed this plant to some extent, in his practice in St. John's, Berkley, S. C., in jaundice, in doses of two to six grains of the root. He did not trust to it exclusively, but found it most effectual in those cases characterized by torpor of the liver, attended with colic and yellowness of the skin. See his letter to Dr. Bigelow. He gave, too, with success, in hydrothorax, the tincture in doses of sixty drops, three times a day, increased until nausea followed its employment. Eberle, in his work on Diseases of Children, p. 97, says that the powdered root is an excellent escharotic in ulceration of the umbilicus. Griffith's Med. Bot. 127 It is observed by some that the seeds are more narcotic than the root,

inducing symptoms resembling those produced by stramonium. The dose of powder as an emetic, x-xx grs.; as a stimulating expectorant, iii-v grs.; or an infusion of one-half ounce of the root to one pint of water—dose, a tablespoonful; of the tincture, it is one-half a drachm; a larger quantity acts as an emetic. The tincture is made by adding two ounces of the bruised root to one pint of alcohol. Macerate fourteen days. It is expectorant and alterative. Dr. Donney says the leaves are administered in veterinary practice in Maryland, to produce sweating, and to facilitate the shedding of hair in the spring. Dr. Griffith is convinced of its efficacy in this respect, and he has also given the fresh root mixed with the food, at intervals, to destroy bots in horses—one or two roots proving sufficient. In a communication from Dr. Branch, of Abbeville district, S. C., he informs me that he has for many years employed the decoction of the root in croup; he prefers it to any other single remedy; and, by persisting in it till emesis is produced, he is of the opinion that it prevents the formation of the diptheritic membrane. From his own experience, he considers it a specific in the early stages of the disease, preferring, for infants, the infusion to the tincture, as the difficulty of exciting vomiting frequently renders it necessary to give more of the alcohol than would be prudent. He finds it convenient, when called to a case of croup, to add to thirty grains of the powdered, or bruised root, a teacupful of boiling water, allowing it to steep for ten or fifteen minutes over the fire, when it may be given in teaspoonful doses, frequently repeated, until vomiting is induced; if the patient is relieved, continue it in doses short of the emetic point, every hour or two, increasing it in frequency and amount should the symptoms require it. Dr. B. is of the opinion that it owes its value to three qualities combined: an acrid, an emetic, and a deobstruent property—the latter acting on the glandular system. It possesses, also, the peculiar advantage of not producing bad effects by accumulation; a teacupful not debilitating any more than a smaller quantity, and neither

inducing prostration, which, in the disease in question, is an important consideration. If the patient's skin is hot and dry, the addition of a few grains of ipecacuanha is advised. The experience of Dr. Branch corroborates that of others respecting the value of the tincture, in doses of ten to fifteen drops, given three or four times a day, as an expectorant in chronic cough. In emetic doses, it proves a useful promoter of expectoration in pneumonia. The decoction of the root, taken in small doses, may be used wherever a nauseant and expectorant is required, and will aid in preventing the advance of colds, croup, pneumonia, etc. The juice of the root was used by the Indians as a red pigment, and it has been applied to the arts. Dr. Donney says that the sulph. of alumina will partially fix the color in woollen stuffs, and the murio. sulph. of lead in cotton and linen. The stain, applied to the unbroken skin, is not indelible. Lawson, in his account of Carolina, says, that the Puccoon is *Batschia canescens* (*Lithospermum canescens*), growing in upper districts. See Pursh's Flora and Croom's Catalogue.

The above was contained in my report on Med. Botany of S. C., published in 1849. Since that period, I have used the tinct. of sanguinaria largely during five years attendance upon the Marine Hospital, and in private practice. I employ no vegetable substance so constantly, as an addition to cough mixtures, and as an alterative and tonic, when I think the functions of the liver not sufficiently active. We must avoid adding too much of the tincture to any mixture, lest it convert it into a nauseant or emetic. Without being able to state precisely why, I can only say that it has proved a highly satisfactory agent in my hands as a tonic, alterative, and expectorant. Though paying some attention to medicinal plants, I use habitually very few of them, viz: the sanguinaria, hoarhound, blackberry root, and a few others. My endeavor is not so much to avoid a great multiplicity of agents, as to do no injury with any. The more full and accurate our knowledge, the more skilful is

our application, whether the substances used be vegetable or mineral.

Fumaria officinalis, Linn. Hook. Fl. Bo., Fumitory. Natural, says Elliott, on John's island, and at Mr. Middleton's on Ashley river.

This plant received great attention in former times, and was almost universally employed. Pliny speaks of it, lib. 25, c. 13. According to Hoffman and Boerhaave, the juice taken in large doses is diuretic and laxative. Great confidence was placed in its virtues by Cullen. Mat. Med. ii, 77. In the Dém. Élém. de Bot., it is referred to as a diuretic and detersive aperient, employed as a purifier of the blood in scrofulous and cutaneous diseases. It was administered in amenorrhœa, loss of appetite, and hypochondriacal affections; Fl. Scotica, 379. Boerhaave frequently prescribed it in jaundice and bilious colics. Thornton, in his Fam. Herb. 628, asserts that he had experienced its value in cutaneous diseases. Its acrimonious property is volatile; hence, it should be given in whey. Mér. and de L. Dict. de M. Méd. iii, 310; Fl. Méd. iv, 153. "A marked bitter, which increases on being dried." A popular depurative remedy, which augments the action of the organs, and therefore useful in the diseases specified. Mérat says, it was very generally allowed to be a specific in elephantiasis, acting without any evacuation or appreciable effect. Barbier, M. Med. 381; U. S. Disp. 1254. An extract of the expressed juice, or a decoction, throws out upon its surface a copious saline efflorescence. "The plant indeed abounds in saline substances." Griffith, Med. Bot. 118. It is still employed in France; given in the form of decoction, extract, syrup, or expressed juice.

In observing the enormous amount of potash said by Ure to exist in the ashes of this plant (fourth London edition, 1853), I can now well understand some of the statements made above, which I had published several years since in my report to the American Medical Association. It is

another evidence of the light thrown upon any subject by facts gathered from different sources and by independent inquirers. See article "Potash." Wormwood, artemisia, tobacco, corn and rice stalks, etc., contain potash in large proportion. The two first mentioned in enormous amount relatively.

NYMPHÆACEÆ. (*The Water Lily Tribe.*)

This order is generally considered antaphrodisiac, sedative, and narcotic. Their stems are bitter and astringent; they contain a considerable quantity of fecula, and, after repeated washings, are capable of being used for food.

Nymphæa odorata, Ait. Kew. and Ph. Sweet-scented water-lily; pond-lily. Diffused in lower country of South Carolina; roots immersed. Newbern. Fl. April.

U S. Disp. 1280; Mat. Veg. Pract. 201; Thompson's Steam Pract. Big. Am. Med. Bot. 132; Cutler, Am. Trans. i, 456. "An antaphrodisiac." The root possesses a high degree of astringency, containing, according to Dr. Bigelow, tannin and gallic acid. It is a popular remedy in bowel complaints; and is used as an astringent in gleet, fluor albus, etc. It also forms an excellent demulcent poultice for ulcers. Mér. and de L. Dict. de M. Méd. iv, 643; Bull. des. Sci. Méd. iii, 74. Ainslie, in his Mat. Med. Ind. ii, 381, says that, in India, they prepare with it a refreshing liniment for the head. Thompson employed this plant in the steam practice, and Matson recommends it as a gargle in sore throats.

CEPHALOTACEÆ.

We insert this order, the properties of which are unknown, merely to introduce the non-medicinal, but very remarkable plant, the

Dionœa muscipula, Ellis, L. Venus fly-trap. Gen. C. C. Pinckney informed Mr. Elliott of the only locality of this

interesting plant in this state, viz.: on the margin of the Santee river, between Lynch's ferry and the sea, particularly at Collins' and Bowman's bridges. Newbern. Fl. May. Its leaves possess great sensibility, and are prehensile: closing up and confining insects and any foreign body which comes in contact with it. See Curtis, in Bost. Journal Nat. Hist. i, p. 123, the article "Sarracenia" infra, and authors passim. "Miraculum naturæ! folia triloba, radicalia, ciliata, sensibilia, conduplicanda, insecta incarceranda. *Ellis, Epist. ad Linnæum.* Croom's Cat.

MAGNOLIACEÆ. (*The Magnolia Tribe.*)

This order is characterized by the possession of a bitter tonic taste, and fragrant flowers; the latter generally producing a decided action upon the nerves.

Magnolia glauca, L. Bay; beaver tree; swamp-laurel. Diffused in damp pine lands. Charleston; Newbern. Fl. June.

Big. Am. Med. Bot. ii, 67; Bart. i, 77; U. S. Disp. 442; Pe. Mat. Med. ii, 733; Royle, Mat. Med. 248; Ball and Gar. 189; Michaux, N. Am. Sylvia, ii, 8; Kalm's Travels, i, 205; Humphries, Med. Comment. xviii; Mér. and de L. Dict. de M. Méd. iv, 193; Marshall's Arbust. 83; Bart. Mat. Med. 46; Price, Inaug. Diss. Phil. 1812; Lind. Nat. Syst. 18; Am. Herbal, 200; Griffith, Med. Bot. 97. It is a stimulant, aromatic tonic, with considerable diaphoretic powers. The leaves, steeped in brandy, or a decoction of them, are valuable in pectoral affections, recent cold, etc. The tincture, made by macerating the fresh cones and seeds, or bark of root, in brandy, which best extracts its virtues, is much used as a popular remedy in rheumatism; and, according to Barton, in inflammatory gout. Lindley refers to it as a valuable tonic, but it is said to be destitute of tannin or gallic acid. The bark of the root, according to Griffith, was employed by Indians to fulfil a variety of indications; the warm decoction acts as a gentle laxa-

tive, and subsequently as a sudorific, whilst the cold decoction, powder of, or tincture, is tonic. These have proved very beneficial in the hands of regular practitioners in the treatment of remittents of a typhoid character. It is supposed by many residing in the lower portions of this state that this tree prevents the water of bogs and galls from generating malaria. It certainly seems that the water is much clearer in which the bay tree grows.*

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* In that old work on Herbs, entitled the "English Physician," by Nicholas Culpepper, gentleman, "Student in Physic and Astrology," we have met with a great deal concerning the employment of herbs in medicine; but, from the absence of botanical terms, it is impossible to ascertain, in many cases, what species are intended. In order to show the surprisingly superstitious credence then attached to the influence of astrology, in determining the virtues of, and the times proper for gathering plants, and also the diversity of qualities attributed to them, we will extract a portion of what Culpepper says of the "Bay Tree." "*Government and Virtues.*—That it is a Tree of the Sun, and under the celestial Sign Leo, and resisteth Witchcraft very potently, as also all the Evils old Saturn can do to the Body of Man, and they are not a few: for it is the Speech of one, and I am mistaken if it were not Mezaldus, that neither Witch nor Devil, Thunder nor Lightning, will hurt a Man in the Place where a Bay Tree is. Galen said that the Leaves or Bark do dry and heal very much, and the Berries more than the Leaves; the Bark of the Root is less sharp and hot, but more bitter, and hath some Astriction withal, whereby it is effectual to break the Stone, and good to open Obstructions of the Liver, Spleen, and other inward Parts, which bring the Dropsy, Jaundice, etc. The Berries are very effectual against all poison of venomous Creatures, and the Sting of Wasps and Bees, as also against the Pestilence, and other infectious Diseases, and therefore put into sundry Treacles for the purpose. They, likewise, procure Women's Courses, and seven of them given to a Woman in Sore Travel of Child-birth do cause a speedy Delivery, and expel the after-birth, and therefore are not to be taken by such as have not gone their Time, lest they procure Abortion, or cause Labour too soon. They wonderfully help all cold and rheumatic Distillations from the Brain to the Eyes, Lungs, or other Parts, and being made into an Electuary with Honey, do help the Consumption, Old Coughs, Shortness of Breath, and thin Rheums, as also the Megrim. They mightily expel the Wind, and provoke Urines, help the Mother, and kill the Worms. The Leaves also work the like Effects; a Bath of the Decoction of the Leaves and Berries is singularly good for Women to sit in that are troubled with the Mother, or the Diseases thereof, or the stoppings of their Courses, or for the Diseases of the Bladder, Pains in the Bowels by Wind, and stopping of Urine; a Decoction, etc., settleth the Palate of the Mouth in its Place. The Oil made of the Berries is very comfortable. All Cold Griefs of the Joints, Nerves, Arteries, Stomach, Belly, or Womb, and helpeth Palsies, Convulsions, Cramps, Aches, Tremblings, and Numbness in any Part, Weariness also, and Pains that come by Sore Travelling. * * * * Pains in the Ears are also cured by dropping in some of the Oil, or by receiving into the Ears the Fume of the Decoction of the Berries through a Funnel. It takes away the Marks of Bruises; it helpeth also the Itch, Scabs, and Weals in the Skin," etc.

Magnolia grandiflora, L. Magnolia. This magnificent tree grows abundantly along the sea-coast, and in the streets of Charleston. Found sparingly in St. John's, Berkley, forty-five miles from the ocean; grows in Georgia also. Fl. May.

Mér. and de L. Dict. de M. Méd. iv, 193; Pe. Mat. Med. and Therap. ii, 734; U. S. Disp. 444. The medicinal and chemical properties of these plants are supposed to be identical. See M. glauca. Mr. Proctor, in his analysis, Am. Journal Pharm. xiv, 95, and viii, 85, found in this species volatile oil, resin, and a crystallizable principle analogous to the liriodendrine of Prof. Emmet, obtained from the L. tulipifera growing in this state (vide L. tulip.) Mérat says that in Mexico the seeds are employed with success in paralysis. *Loc. sit. sup.*

Magnolia acuminata, Linn. Mich. Cucumber tree. Mountainous districts; grows in Georgia also. Fl. July.

U. S. Disp. 443; Mx. N Am. Sylvia, ii, 12; Lind. Nat. Syst. 16. Lindley speaks particularly of the cones of this species being employed in the form of a spirituous tincture in rheumatic affections. Mér. and de L. Dict. de M. Méd. iv, 193; Griffith, Med. Bot. 98. Used as a prophylactic in autumnal fevers.

The wood is soft, fine grained, and susceptible of a brilliant polish. It is sometimes sawed into boards, and used in the interior of wooden houses.

The flowers of most magnolias exhale a strong aromatic fragrance; the bark of all possesses a combination of bitter and hotly aromatic properties, without astringency, and that of many acts as a powerful medicine, in a similar way to Peruvian bark and Winter's bark. Wilson's Rural Cyc.

Magnolia umbrella, Lam. } Umbrella tree.
" *tripetala*, Linn. and Ell. Sk. } Rare. Grows on the sea-coast in rich soils; Newbern. Fl. June.

U. S. Disp. 443. It has a warm, aromatic odor, and is possessed of similar properties with the above. Mx. N.

Am. Sylvia, ii, 19; Lind. Nat. Syst. 16. According to De Cand. and Mérat, Dict. de M. Méd. iv, 193, it acts so powerfully on the nerves as to induce sickness and headache.

Magnolia macrophylla. Mx. and Ell. Sk. Grows on the mountains of South Carolina. It possesses the most magnificent foliage and flowers of any of our forest trees; the former are a foot or two in length; and the latter one foot in diameter. For its medicinal properties, see M. glauca. See, also, Griffith's Med. Bot. 98, and Ell. Sk. of Bot. of S. C.

Illicium Floridanum and parviflorum. Anise seed tree. These plants have the smell of anise seed, and should be examined.

Liriodendron tulipifera, L. Tulip tree; white wood; poplar. Grows in swamps; diffused. Collected in St. John's, Charleston district; Columbia; Newbern. Fl. June.

Eberle, Mat. Med. ii, 308; U. S. Disp. 432; Rush, in Trans. Phil. Coll. Phy. 1798; Pe. Mat. Med. ii, 743; younger Michaux on Forest Trees of N. America; Clayton, Phil. Trans. 8; Carey's Am. Museum, 12; Barton's Collec. Form. Mat. Med. 14; Thacher's U. S. Disp.; Big. Am. Med. Bot. ii, 107; Barton, i, 92; Ball. Gar. Mat. Med. 190; Mér. and de L. Dict. de M. Méd. iv, 130; Annal. de Chimie, lxxx, 215; Lind. Nat. Syst. Bot.; Rogers' Inaug. Diss. 1802. This plant is tonic, diuretic, and diaphoretic, and is generally considered one of the most valuable of the substitutes for Peruvian bark. It has been employed as a warm sudorific in the treatment of chronic rheumatism and gout; and Bigelow thinks it valuable as a stomachic. It was administered by Dr. Young and himself, combined with laudanum, in hysteria, and the former says that in all the materia medica he does not know of a more certain, speedy, and effectual remedy for that disease. See his letter to Governor Clayton. "He has never known it to fail in a single case of worms." Am. Museum, xii; Griffith,

Med. Bot. 98. Rafinesque says the seeds are laxative, and the leaves are used as an external application for headache; they are washed and applied to the forehead. Mérat states that it is useful in phthisis, and he also refers to its vermifuge properties; employed in relaxed states of the stomach (*relâchemens*) and in the advanced stages of dysentery; this is corroborated by Thacher, Anc. Journal de Méd. lxx, 530; J C. Mayer, Mém. on L. tulipifera, in the Mém de l'Acad. de Berlin, 1796; Ruch. Mém. sur le tulipier, Tilloch's Magazine; Hildebrande, Essai sur un nouveau succédané du quinquina in Ann. de Chim. lxvi, 201; Carminati sur les propriétés médicinales de l'écorce de tulipier. Its analysis, etc., in the Mem. of Roy. Inst. Lombardy, iii, 4; in the Supplem. to Mér. Dict. 1846, 436. M. Bouchardat advises, as the most preferable mode of exhibiting it in fevers, the wine of the tulip, made with the bark in equal parts of alcohol, to which he adds of white wine seven or eight times the amount of the alcoholic infusion. Bull. de Thérap. xix, 246; S. Cubiere's Hist. Tulip. Paris, 1800; see Tract. of Bouchardat in Ann. de Thérap. 75, 1841. Dr. J. P Emmet, in his Analysis in the Phil. Journal Pharm. iii, 5, announced the discovery of a new principle in it—the liriodendrine. This is solid, brittle, and inodorous at 40°, fusible at 180°, and volatile at 270° It is soluble in alcohol, thought to be analogous to camphor, and to the principle found in the magnolia grandiflora, and to consist of a resin and a volatile oil; hence the alcoholic tincture is preferable. The powdered bark in syrup is given to children who are liable to convulsions from worms, to promote their expulsion, and to strengthen the tone of the digestive organs. The bark should be pulverized and bottled. We have employed a strong infusion of the bark and root of this plant as an anti-intermittent, among a number of negroes, and are much pleased with its efficacy. See the Podophyllum peltatum, in conjunction with which it was usually given. In Virginia, the decoction of the bark, with that of the Cornus Florida (dogwood) and the Prinos verticillatus, is given to horses affected with the bots. The

poplar bark powdered is a valuable remedy as a tonic for horses. An infusion may be given to a horse, or the bark placed in his trough to be chewed. It gives tone to the digestive organs when they are "off their feed," in veterinary or jockey parlance. This tree I notice in unusual abundance along the line of railroad from Kingsville to Columbia, S. C.; also in Spartanburg district, S. C., on the banks of streams. Dose of bark xx–xxx grs. It is a stimulant tonic, slightly diaphoretic. The infusion or decoction is made in the proportion of an ounce to a pint of water; dose one or two fluid ounces. Dose of the saturated tincture a fluid drachm. The wood is durable when not exposed to the weather—it is smooth, fine grained, and flexible; employed for various mechanical purposes—for carving and ornamental work; for making carriage and door panels, chairs, cabinets, etc. Mx. Forest Trees of America.

ANONACEÆ. (*The Papaw Tribe.*)

The plants of this order generally possess a powerful aromatic taste and smell in all the parts.

Uvaria triloba, T. and Gray.
Anona " Linn.
Asimina " Ell. Sk.

Papaw; custard apple. Grows in rich soils along streams. We have observed it in Fairfield and Spartanburg districts, S. C., and collected it in St. John's; Mr. Elliott says it is found at Beck's ferry, Savannah river. Fl. May.

Dict. de Mat. Méd. par Mér. and de L. tom. i, 311. The rind of the fruit of the A. triloba of Linn. possesses a very active acid; pulp sometimes employed as a topical application in ulcers. Lind. Nat. Syst. Bot. 69. "Juice of unripe fruit is a powerful and efficient vermifuge; the powder of the seeds answers the same purpose; a principal constituent of the juice is fibrine—a product supposed peculiar to animal substances and to fungi." "The tree has, moreover, the property of rendering the toughest animal substances

tender by causing a separation of the muscular fibre—its very vapor even does this; newly killed meat suspended over the leaves, and even old hogs and poultry, when fed on the leaves and fruit, become 'tender in a few hours!'" Lind. loc. cit. The sap (of Papaw tree, *Carica papaya*), which is extracted from the fruit by incision, is white and excessively viscous. In a specimen from the Isle of France, Vauquelin found a matter having the chemical properties of animal albumen, and lastly, fatty matter. Boussingault. This tree can be found in many parts of the state, and we would invite examination into these very curious properties. For an excellent description of the papaw, see Hooker in the Bot. Magazine, 898. At Pittsburgh, a spirituous liquor has been made from the fruit. Michaux notices that the cellular integument of the bark, and particularly that of the roots, exhales in summer a nauseous odor so strong as to occasion sickness if respired in confined air. Am. Sylva.

UMBELLIFERÆ. (*The Umbelliferous Tribe.*)

This order is nearly related to the Ranunculaceæ, and is generally found in cold countries, and on the mountains of tropical regions. The plants belonging to it are often poisonous, some virulently so; others are nutritive and wholesome; of the former, the hemlock is an example; of the latter, the celery and parsley.

Hydrocotyle umbellata, L. Grows in bogs and wet marshes; collected in St. John's; vicinity of Charleston; Newbern. Fl. May.

Mér. and de L. Dict. de M. Méd. tom. iii, 560. Employed with great efficacy in Brazil against hypochondriacism. According to one author, the root is so valuable in diseases of the kidney as not to be replaced by any other medicines. It is emetic, diuretic, and vulnerary. We see no mention of it in the English or American works.

Sanicula Marylandica, L. Sanicle. Diffused; grows in shady spots; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 201. The Indians used it as we do sarsaparilla in syphilis, and also in diseases of the lungs.

Eryngium aquaticum, L. (*E. Yuccæfolium* of Mx.) Button snakeroot. Damp pine lands; diffused; collected in St. John's; Charleston. Fl. July.

Coxe, Am. Disp. 268; Ell. Bot. i, 343; Barton's Collec. i, 3; Frost's Elems. 280; U. S. Disp. 318; Mér. and de L. Dict. de M. Méd. iii, 145; Shec. Flora Carol. art. Button snakeroot, 310, 545. The decoction is diaphoretic, expectorant, and sometimes emetic. Elliott says it is preferred by some physicians to the seneka snakeroot. Barton, in his Collections, states that it is allied to the contrayerva of the shops. This plant is possessed of undoubted diuretic powers, and in combination with the Iris versicolor (blue flag), was much employed by Dr. McBride, of South Carolina, in dropsy. (See I, versic.) Great use is frequently made of them in popular practice. Shec. in his Flora Carol. 310, states that the decoction and tincture are given with benefit in pleurisies, colds, and most of the inflammatory diseases of the mucous passages. It is also said to act as an escharotic — keeping down fungus flesh, and preventing mortification. The root, when chewed, sensibly excites a flow of saliva. The *E. aromaticum*, an aromatic species, grows in East and South Florida. Baldwin in Chapman's Flora. The *E. maratimum*, of England, penetrates the soil to the depth of twenty feet.

Eryngium fœtidum, L. Fever weed. Elliott is doubtful whether this plant comes within the limits prescribed to us; it has, however, been noticed by writers as a S. C. species, and Michaux found it in Florida. T. and Gray are of the opinion that it is not a native of the United States. Vicinity of Charleston, Bachman; Shec. Flora. Carol. 54. "An admirable febrifuge." Mér. and de L. Dict. de M. Méd. iii, 145; Aublet, i, 284. Rotboll says it is a sedative, alterative, and febrifuge. Sprengel, Hist. de la Méd. v,

467; Lind. Species, Pl. 336. Not included in Chapman's Flora.

Aconitum uncinatum, L. Aconite, monks-hood, wolfsbane. Shady banks of streams among the mountains of Confederate States, and northward.

Most of the aconites, particularly those with blue flowers, are highly poisonous. This species should be carefully experimented with, as it may be made to supply the tincture of aconite and aconita for medicinal and chemical purposes. The active principle is "the most virulent poison known, not excepting prussic acid, as prepared by Moison, of London. 1-50 of a grain has endangered life." Wilson's Rural Encyc. See also works on Materia Medica. "The 1-100 part of a grain has produced a feeling of numbness, weight, and constriction, which has lasted a whole day." The tincture of aconite is more manageable, and is useful as an external anæsthetic in frontal neuralgia, local pains, etc. No remedy, save chloroform, equals it when applied locally for the relief of pain. The tincture may be combined with oil and chloroform, as a liniment in rheumatism.

Cicuta maculata, L. Walt. Fl., Carolina. Am. hemlock; snake-weed; beaver poison. Grows in bogs and inundated land; collected in St. John's; Charleston; Newbern. Fl. Aug.

U. S. Disp. 1242; Barton's Collec. 1846; Mér. and de L. Dict. de M. Méd. ii, 282; Big. Am. Med. Bot. i, 125; Schœpf, M. Med. 36; Stockbridge, N. England Journal, iii, 334; Mitchell, Ely, and Muhlenburg, Med. Repos. xvii, 303; Stearns, Am. Herbal, 172. The leaves, flowers, and seeds are resolvent, powerfully narcotic, sedative, and anodyne. It resembles conium in its effects, and is used as a substitute for it. "It relieves pain from cancer more powerfully than opium;" employed in ill-conditioned ulcers, gleets, painful uterine discharges, venereal ulcers, epilepsies, and convulsions; it promotes perspiration and urine,

and, externally applied, discusses hard tumours. It is closely analogous to the European species, the C. virosa; Bigelow says identical with it. The dose of the leaves in powder is one to two grains three times a day, in infusion, or one grain of the extract, increasing it as the system becomes tolerant. This plant has repeatedly occasioned the death of those mistaking it for others. An active emetic, to which an infusion of galls may be added; will generally give relief. The vegetable acids, lemon juice, and vinegar, neutralize its effects: and strong tea and coffee are the best antidotes for the stupor which follows its employment.

Apium graveolens. Celery. Ex. cult. Milne, Ind. Bot. 420. The fresh roots, observes Dr. Lewis, when produced in their native water soil, are supposed to partake of the ill quality of those of the hemlock kind, and to be particularly hurtful to epileptic and pregnant women. So that we have here a striking evidence of the excellence of the Nat. Syst., as it may be remembered that, in describing the characteristics of this order, this plant was alluded to as forming an exception.

Apium petroselinum. Parsley Ex. cult. Leaves aromatic and slightly diuretic. See authors.

Discopleura capillacea, D. C. and T. and Gray } Bishop's
Ammi majus of Walter. } weed.
Grows in damp soils. Fl. July. Shec. Flora Carol. 136.

Sium nodiflorum, Walt. and Ell. Sk. } "Probably intro-
Helosciadium of Koch. } duced; abundant
around Charleston." Ell.

Thornton's Fam. Herbal, 297; Ray s Cat. Plantarum, 213; Dict. de M. Méd. It is recommended in cutaneous eruptions. Withering relates the case of a young lady, who was cured of a very obstinate attack by taking three large spoonfuls of the juice twice a day; "and I have repeatedly seen," says Thornton, "two ounces administered every

morning, with the greatest advantage." It is not nauseous, and children take it readily, mixed with milk. When it is prepared in this way it is not disagreeable, and does not affect the head, stomach, or bowels. U. S. Disp. 1296. The juice has also been employed in scrofulous swellings of the lymphatic glands, and is considered diuretic. Mér. and de L. Dict. 369; Bull. des Sc. M. de Férus. xviii, 420 and xx, 421.

Fœniculum officinale. Fennel. Introduced from Europe; cultivated.

Seeds of fennel are well known; employed in flatulent colic for their carminative and stimulant properties. The oil of fennel is also used for the same purpose, and to correct the taste of medicine. See authors.

Angelica lucida, Ell. Sk. } Angelica. We have collected
Archangelica of some. } it in Fairfield district; also in upper St. John's, Charleston district. Fl. July.

Pe. Mat. Med. and Therap. ii, 469; Ed. and Vav. Mat. Méd. 276; Le. M. Med. i, 85; Woodv. Med. Bot. 86; U. S. Disp. 98; Journal de Pharm. 3e sér. 2; Mér. and de L. Dict. de M. Méd. i, 296; Shec. Flora Carol. 167 The root is edible, and possesses more aroma than any of our indigenous plants. It is used in spasmodic vomiting, flatulent colics, and nervous headaches; some say it is powerfully emmenagogue. The vittæ of some species are filled with a pungent oil. A candy is sometimes prepared with the roots boiled in sugar. The great fragrance of this root has caused it to be used for many purposes by the confectioner and others; the tender stalks also are candied. The seeds are cordial, tonic, and carminative; and the plant was in repute at one time as a preventive of pestilence to those who bore it about them. "The pulverized root, in doses of a drachm, is said to be very useful in pestilential fevers and diseases of the liver; and a paste of its root and vinegar used to be carried and smelled at by physicians during the prevalence of epidemics, as a preventive of infection."

Wilson's Rural Cyc. "Angelica" is stated in some tables to yield more potash even than wormwood or fumitory. See "*Chenopodium*" and "Fumaria" in this volume.

Anethum fœniculum, L. Dill. Introd. cult. in South Carolina.

It is employed in flatulent colic as a carminative and antispasmodic. The oil has been given in hiccough. Milne, in his Ind. Bot. 404, says: "The herb, boiled in broth, has been used with great success in preventing obesity." See authors.

Daucus carota, Tourn. Carrot. Completely naturalized, says Elliott, in South Carolina and Georgia. Collected in St. John's; Charleston. Fl. April.

Woodv. Med. Bot.; Royle, Mat. Med. 401. Root and seeds stimulant, carminative, and eminently diuretic; employed with great success in strangury, anasarcous swellings of lower extremities, in suppression of urine, and painful micturition. Eberle on Diseases of Children, 110; Am. Herbal, 92; Frost's Elems. Mat. Med. 298. Dr. Chapman used a strong infusion in gravel. Mér. and de L. Dict. de M. Méd. 299; Flora Méd. ii, 99; see Chemical Anal. by Bouillon Lagrange, in the Journal de Pharm. i, 529. Britanet and himself wrote a book on the plant (which may be seen in the New York Hosp. Lib.) Root contains some volatile oil, a large proportion of pectin, a peculiar coloring principle called carotin, and sugar. Griffith, Med. Bot. 337 The authors alluded to above contend that the plant acts as a sedative, even topically applied. In the form of a poultice, it calms pain, is antiseptic, and corrects the intolerable fetor arising from internal diseases—as of the ear, for example. Dr. Geo. Wilkes, ophthalmic surgeon, New York, informs me that he finds it invaluable in this respect. Mém. de Muséum, iv, 102; Suppl. to Mér. and de L. 1846; Vauquelin upon the Pectic Acid in the Root of the Carrot, Journal de Pharm. xv, 340. The essential oil is regarded as emmenagogue and antihysteric.

Ancien Journal de Méd. xxiv, 68. In Germany, it is considered vermifuge. Crantz, Mat. Med. i, 23. Shecut, in his Flora Carol., alludes to its employment in gravel, and in expelling a species of tape worm. A syrup similar to treacle has been obtained from it, and by distillation, a liquor nearly equal in flavor to brandy. Much use is made of this plant in popular practice as a diuretic.

Daucus pusillus, Mx. Wild carrot. Grows on the Savannah river; collected in St. John's; Charleston. Bach.

Eberle, Mat. Med. and Therap. ii, 318; Bell's Pract. Dict. 162. Seeds contain more volatile oil than the other species. It, however, possesses nearly the same properties. Used as a diuretic in calculous diseases, suppression of urine, etc.

ARALIACEÆ. (*The Aralia Tribe.*)

Panax quinquefolium, L. Ginseng. Rich soils in the mountains of South Carolina. Fl. May.

Am. Herbal, 157, by Stearns. In China they drink an infusion of the root instead of tea, and it is well known that they have recourse to it as a last resort in all diseases: Dr. James says, more especially in all cachectic and consumptive cases, and in those arising from debility of any kind. Dr. Healde also alludes to their great confidence in it as a restorative after great fatigue, as an antispasmodic in nervous affections, in coma, and as an aphrodisiac; one hundred and twenty grains of the sliced root are boiled in a quart of water, and two ounces of the decoction, or twenty grains of the root in substance is employed. Jartoux, in the Phil. Trans. xxviii, 239, states that, after being fatigued by travelling three days, he employed the decoction of the leaves internally, and as an application to the feet, and was satisfied of its utility, being completely revived by it. Dr. Wood, in the U. S. Disp. 530, says, it is very little more than a demulcent; but Lindley, Nat. Syst. Bot. 25, thinks that there is no reasonable doubt of the ginseng having an invigorating and stimulant power, when

fresh. Big. Am. Med. Bot. ii, 82; Mér. and de L. Dict. de M. Méd. iii, 356, and iv, 176; Flor. Méd. iv, 185; Kaempher, Amoen. Academicæ, v, 218; Histoire du Japon, vi, 218;. Burmann, Flora Ind. tab. 29, i; L'Encyclop. Chinoise, lxcii; Flora Cochine, 806; Lafitteau, Descrip. du Ginseng, Paris, 1718, i, 12. Dr. Sarrazin introduced it into notice in Europe. Trans. Roy. Acad. Sci., Bartram Com. 61, 1741; J. P Bregnius, Diss. Med. de Radice Ginseng, 1700; Coxe, Am. Disp. 434. Cullen, in his Mat. Med. 270, refers to its efficacy in increasing virility. See Mérat, loc. cit. "J'avoue qu'un individu qui en avait fait usage dans cet dernière intention, pendant long temps, n'en obtint absolument aucun résultat." S. Vaillant in Acad. des Sci. 1718; Bourdelin, Hist. de l'Acad. 1797; Lafitteau, Mem. concernant la précieuse plante de Ginseng, Paris, 1788; Kalm. Travels, iii, 114; Osbeck's China, 145; Heberden, Med. Trans. iii, 34; Fothergill, Gent. Mag. xxiv, 209; loc. cit. sup. The root is thought to resemble liquorice, and may partially supply the place of that article: see report from Surgeon-General's office, 1862.

Glycyrrhiza glabra; liquorice. Exotic. I am uncertain as to the position of this genus in the natural system. This plant is said to be well adapted to the southern states of the Confederacy. It has been grown in Texas. Information as to the best mode of planting and culture can be found in a paper in Patent Office Rep. 1854, p. 359. I append the following practical remarks: "The sooner liquorice is sold the heavier it weighs; and the greener it is the more virtue it contains. It is sold in three distinct forms, viz: in the roots, in powder, and in its inspissated juice. The first of these needs no explanation. The second is prepared by cutting the small roots into small pieces, drying them in an oven or kiln, and grinding them in a mill. The third kind is prepared by pounding the smaller roots and fragments with cold water for nearly two days; after which the pulp is to be squeezed, and the juice boiled down in an iron pot to a pitchy consistence, and then rolled

or stamped into sticks or cakes, which are sometimes sold under the name of 'Spanish Liquorice.' Liquorice roots will keep a year if laid in sand, and stored in a cool, dry cellar; and if the sets, or runners, or buds, are cut ready for planting, tied in bundles, and sent by land carriage, they will keep a fortnight. If packed in sand, and sent by water, they will keep some three or four months, especially the more hardy buds." In the Patent Office Reports for 1854, '55, the cultivation of a number of medicinal plants is described, particularly those yielding aromatic oils.

Aralia spinosa, L. Toothache bush; Angelica tree; Prickly ash. Collected in St. John's; rich soils along fences; Charleston. Plant often confounded with the Xanthoxylon; properties somewhat similar. See X. fraxineum. Ell. Bot. 373; Mér. and de L. Dict. de M. Méd. i, 379; Coxe, Am. Disp. 100; Shec. Flora Carol. 191; Frost's Elems. 20; Griffith, Med. Bot. 345. It is a stimulating and very certain diaphoretic, "probably to be preferred to any emetic yet discovered among our native plants." The infusion of bark of root is used in chronic rheumatism and cutaneous eruptions, also employed in lues venerea. Pursh states that a vinous or spirituous infusion of the berries is remarkable for its power in relieving rheumatic pains, and the tincture is also given in Virginia in violent colics. See Dr. Meara's experiments. Mérat says, it has been used to allay pain caused by carious teeth. Dose, of the saturated tincture, a tablespoonful three times a day. A decoction is often preferred in rheumatism, made by boiling an ounce of the bark in a quart of water: taken in divided doses several times a day. In South Carolina, this plant is the rattlesnake's master *par excellence*, according to the negroes; they rely on it almost exclusively as a remedy for the bite of serpents. I am informed that they use the bark of the fresh root in substance, taken internally, also applying it powdered to the wounded part. Dr. Meara advises that the watery infusion, when employed as a diaphoretic, should be made very weak, as it is apt to excite nausea, and cause irritation of the salivary glands.

Aralia racemosa, L. Spikenard. Grows, according to Dr. McBride, in the mountains of South Carolina.

Ell. Bot. Med., note, i, 373. The decoction of the root is much esteemed by those residing in the mountainous districts as a remedy in rheumatism; no doubt possessed of stimulating properties. Michaux cites it as a sudorific. The root, when boiled, yields a gummy substance. A tea, syrup, or tincture, may be made of the roots or berries. It is given in coughs, asthma, and diseases of the lungs. Also given as a stimulant in menstrual obstructions; said to be in high repute among the Indians. See the "Indian Guide to Health." Dr. Sarazzin informs us that it is very useful as a cataplasm in inveterate ulcers; generally adapted to similar purposes with the A. nudicaulis. Mér. and de L. Dict. de M. Méd. i, 376; U. S. Disp.; Am. Journal Med. Sci. xix, 117

Aralia nudicaulis, Mx. Wild sarsaparilla; wild liquorice. Mountains of South Carolina. Fl. June.

Raf. Med. Flora, i, 53; U. S. Disp. 116. A gently stimulating diaphoretic; thought to be alterative, and used in popular practice in rheumatism, syphilis, and cutaneous affections. Mér. and de L. Dict. de M. Méd. i, 375. Dr. Meara records the roots as possessing the virtues of sarsaparilla. Mus. Med. Philos. iv. An excitant, diaphoretic, and entrophic, like mezereon, guaiac, sarsaparilla, and sassafras. The infusion has been employed with success in zona, and as a tonic in debility of stomach (*les relâchemens d'estomac*). Coxe, U. S. Disp. 99; Lindley's Nat. Syst.; Griffith, Med. Bot. 344; Phil. Med. Mus. ii, 161. Administered in domestic practice, in pulmonary disease, where inflammation does not coexist.

BERBERACEÆ. (*The Berberry Tribe.*)

Berberis vulgaris, Walt. Fl. Carol. } American Barberry.
" *Canadensis*, Ph. and Ell. } Grows wild in St. John's, Berkley, near Woodlawn, Pl.; upper districts of Georgia, Carolina, and northward. Fl. May.

Shec. Flora Carol. (see B. vulgaris), 268; Lind. Nat. Syst. Bot. 30; U. S. Disp. 1233, Appendix. The B. vulgaris of Europe, with which this plant is not identical, though differing from it but slightly, if at all, in medicinal properties, has received considerable attention. They are used as a domestic remedy in jaundice, and in dysentery and diarrhœa; it is supposed that the acid is specific. From analysis by Buchner and Herberger, it is shown that the root contains a new principle called berberine, which acts like rhubarb, and with equal promptness and activity. Griffith, Med. Bot. 113; Journal de Pharm. 1233; Trans. Phil. Soc. 1834; Analysis in Journal de Pharm. xxiv, 39; Mér. and de L. Dict. de M. Méd. Supplement, 1846, 101. From the berries a syrup is obtained which is adapted to putrid fevers, and those of a low type; a cooling drink is also made with them, and given in similar cases. The root boiled in lye imparts a yellow color to wool. It was said to have a singular effect upon wheat growing near it, turning the ears black for some distance around; but this, however, is doubted. We have observed the remarkable irritability of the stamens in the species growing in South Carolina, which, when touched, instantly spring down upon the stigma, and in this way communicate their pollen to it. The berries are acid. The English barberry (*B. vulgaris*) has attracted much attention; its fruit is edible, and much discussion has been excited whether or not it produces smut in wheat or corn when planted near it. Experiments touching this peculiarity should be performed with respect to our barberry. For a full statement of the merits of the above question, see Wilson's Rural Cyc. Art. Barberry. Thaër, in his "Principles of Agriculture," p. 409, says: "One very extraordinary fact is that the barberry bush will produce smut, or something very similar to it, in all corn growing within a considerable distance of it. This is a fact which has been confirmed by numerous observations and experiments in almost all countries. But it has never yet been clearly and satisfactorily ascertained in what manner the barberry produces this effect. My friend

Einhoff has made several experiments on the possibility of communicating *æcidium* (a parasitical fungus) to cereals by cutting branches from the barberry, which were quite covered with it, and shaking them over the corn, or else planting them in the midst of it; but he never succeeded in thus producing the disease; therefore it would seem that it is not the communication of this dust, but the vegetation of the barberry in the vicinity of the cornfield, which engenders the disease. Nor will it attack crops planted near young and newly made barberry hedges; but as these latter grow up, the disease will appear until these hedges are rooted up. As soon as the barberry has been thoroughly extirpated, the evil disappears." Thaër considers mil or mel-dew a disease of the skin of plants. See this work for information on diseases affecting the cereals—on irrigation, etc. Translated by William Shaw and C. W Johnson. New York, 1852. It is believed by some in this country that the pokeweed (Phytolacca), if allowed to die in a cotton field, will produce rust. This is quite unlikely.

SARRACENIACEÆ.

The species of this order are exclusively confined to the bogs of this country. Lindley thinks it should also comprehend the Dionæa, which grows in this state, and which also possesses the power of entrapping insects. See D. muscipula.

Sarracenia flava, L., and *variolaris*, M. Fly-catchers; side-saddle flowers. Diffused; grow in bogs; Charleston; Newbern. Fl. June.

See Mér. and de L. Dict. de M. Méd. vi, 226, where the Diss. of Dr. McBride, of South Carolina, in the 12th vol. Trans. Linnæan Soc., is referred to. We have read this description of one of our native botanists, and allude to it with pleasure. We are informed by several gentlemen of this state that these plants are used in dyspepsia with great service. The roots are undoubtedly possessed of bitter,

tonic, and stomachic properties: and we are credibly assured of a number of cases in which relief has been experienced from them. The taste is disagreeable to those using them for the first time, but eventually it becomes pleasant, as we have ourselves experienced. An infusion might serve as a useful substitute for bitters.

In an article on the medicinal and chemical properties of these plants, published by me in the January number (1849) of the Charleston Medical Journal, the attention of the profession is for the first time invited to their reputed value in the treatment of dyspepsia. Several cases are there detailed, illustrating the employment of the sarracenia. It is supposed by many to relieve most of the distressing symptoms of this affection, among which may be cited: gastralgia, pyrosis, acidity, and the general feeling of malaise, so frequently attendant upon it. In some it induces considerable diuresis, and in others soreness of the mouth. In experiments made upon my own person, to ascertain its physiological effects upon a healthy individual, it exhibited a tonic, stimulating influence upon the digestive organs, producing some cerebral disturbance, when persisted in. On one occasion 320 grains of the dried root, in the form of pills, were taken during the course of twelve hours. From the examination made for me by Prof. C. U. Shepard, it contains besides lignin, coloring matter, and traces of a resinous body, an acid, or an acid salt, and also an astringent property, due neither to tannic nor gallic acid, "and a salt of some alkaloid, related perhaps to cinchonia, which, should it prove new, may be called sarracenin." We ascertained the existence of starch in some quantity in the cold infusion and in the decoction, not discovered in the boiled alcoholic solution, which, however, contained some gluten. "In its exhibiting in moderate quantities no very decided nor violent effects upon the animal economy in disease consists its excellence. And its peculiar action on the stomach, we think, is the result of a happy combination of elements, which renders it appropriate to the relief of an affection like dyspepsia. Its acid prevents or

corrects the undue formation of alkalies, or supplies its own deficiency, the existence of either condition having been assumed as explaining the true pathology of the disease. Its power of neutralizing or correcting acidity was obvious. Its bitter property, which is abundant, is tonic and restorative; its resinous portion may supply the proper cathartic stimulus, the too inordinate action of which is corrected by the astringent; and this being neither that of the tannic nor gallic acid found in other vegetable tonics, may be superior. Should dyspepsia be a gastric neuralgia, or consist, as Parry thinks, in a condition of hyperæmia; or as, according to Wilson Philip, a chronic gastritis, its relief may be accounted for, by a narcotic principle contained in the plant; the cerebral disturbance, one of its physiological effects upon our own person, giving some color to the suggestion." (See Art. cit. sup.) A bit of the fresh or dried root of either species may be chewed, and the juice swallowed, during the day before each meal; it may be given powdered in the form of pill, with a little rhubarb if necessary, or a tincture may be made by pouring a pint of brandy over several ounces of the root, of which half an ounce, diluted, may be taken three times a day. I have lately had cases reported to me, of its marked success in the relief of chronic diarrhœa and dysentery, and I am pleased to learn that it is now widely used in other portions of this state, and in Georgia, with very general approbation.

RHIZOPHORACEÆ. (*Mangrove Tribe.*)

Rhizophora mangle, L. Mangrove. This plant is found in South Florida. Chapman. An introduced species is used in India for yielding a black dye.

ONAGRACEÆ. (*The Evening Primrose Tribe.*)

Œnothera biennis, Linn. Scabish. Grows in dry pastures; diffused; collected in Charleston district; Newbern.

Journal Phil. Coll. Pharm. iv, 202; Lind. Nat. Syst. Bot. 36; U. S. Disp. 1281; Dém. Élém. de Bot. ii, 444; Griffith,

Med. Bot. 304. The root and herb have been employed in cutaneous diseases. Dr. Griffith has used it with success in tetter, applying the decoction to the affected part several times a day, and giving it internally at the same time. He has been successful with it in subsequent trials. The plant should be gathered about the flowering season. The young sprigs are mucilaginous, and can be eaten as salad. Lindley. The leaves of the Œnothera expand in the evening, and continue open all night. Pursh states that, even of a dark night, it can be seen at some distance, owing, he supposes, to some phosphoric property. Its roots have a nutty flavor, somewhat similar to those of rampion, and are used in Germany and some parts of France, stewed and raw, in salads, with mustard, oil, salt, and pepper, like common celery. The ancients thought the plant possessed the power of allaying intoxication and calming the most ferocious animals. It is doubtful whether this is the œnothera of the ancients. Wilson's Rural Cyc.

Jussiœa grandiflora, Mich. Grows in bogs; "common around Savannah, and in ponds four miles from Charleston." Dr. J. Bachman informs me that he has seen it in abundance around Charleston for the space of ten miles, from which locality I have specimens. Fl. July. Dr. S. A. Cartwright, of Natchez, asserts that this plant has the power of preventing the development of malaria in regions peculiarly adapted to its generation. He affirms that it "purifies all stagnant water in which it grows—that of the lakes and bayous inhabited by it being as pure to the sight, taste, and smell, as if it had just fallen from the clouds"—ascribing to the presence and peculiar "hygienic or health-preserving properties of this plant" the remarkable exemption of the inhabitants of lower Louisiana from "malarious or miasmatic diseases." "The fact," he adds, "that the region of country in which this aquatic plant abounds is exceedingly healthy, can be established beyond cavil or dispute; it nevertheless contains more stagnant water and swamps than any other inhabited district of the

same extent in the United States." He is quoted in the notes appended by the American editor, to Watson's Pract. Physic, p. 465; and Dr. Wood, in his late work on the Practice of Physic, also makes use of these assertions as if they were established. Dr. C. must seek for the exemption of this section of country from these diseases in other causes, as this plant is abundant around the cities alluded to above, in situations where it is well known that fevers of malarious origin are continually prevailing. I have recently observed this plant growing profusely around Charleston Neck, where intermittent and remittent fevers are notoriously prevalent.

The genus Jussiena has its *roots* distended into vegetable swimming bladders. The curious can examine the *J. grandiflora* to observe this peculiarity, like that in our beautiful Utricularia inflata.

Typha and Nymphæa (water lily), *and Sagittaria*, "display myriads of air chambers in the solid stem." See Wilson, "Aquatic plants."

Ludwigia alternifolia, L. Grows in Charleston district; Elliot says rare; seven miles from Beaufort, and at Savannah; collected in St. John's. Fl. Aug.

Mérat, in the Dict. de M. Méd. iv, 154, says that in America a decoction of the root is employed as an unfailing emetic.

MELASTOMACEÆ.

In this order, a slight degree of astringency is the prevailing characteristic; though a large one, it does not contain a single unwholesome species.

Rhexia glabella, Mx. Deer grass; Sorrel. Grows in moist pine lands, vicinity of Charleston; collected in St. John's. Fl. July.

The leaves of this plant have a sweetish, acid taste, and are eaten with impunity. Deer are said to be fond of them.

Myrtaceæ. (*The Myrtle Tribe.*)

Punica granatum. Pomegranate. Cultivated with success in this state. The bark of the root is a well known astringent; employed in dysentery and diarrhœa; one scruple of the powder may be given at a dose, or a decoction may be used if this is too strong, as it acts on the nervous system. Carson, in his Illust. Med. Bot. i, 1847, states that it has also been employed with success against tænia. A correspondent of the "Mercury," 1862, says that the rind of the fruit yields a jet black fluid, which writes very smoothly and retains its jetty hue." "F J. S."

Hamamelaceæ. (*The Witch-Hazel Tribe.*)

This order, remarks Lindley, is found in the northern parts of North America, Japan, and China. In my examination of the various authorities on the subject before me, I have frequently been struck with the correspondence prevailing between the species found in this state and those of Japan, and this respects only the medical botany of the two; should the flora of each be compared, a still more universal relation might be established. Professor Agassiz has noticed something of the same kind existing between the fossil botany and the fauna of each.

Hamamelis Virginica, L. Witch-hazel. Grows along pine land bays; collected in St. John's, Charleston district; vicinity of Charleston, Bach.

Mér. and de L. Dict. de M. Méd. iii, 452; Coxe, Am. Disp. 310; U. S. Disp. 1258; Matson's Veg. Pract. 201; Griffith's Med. Bot. 350; Rafinesque, Med. Flor. i, 227 It is said to be sedative, astringent, tonic, and discutient. The bark was a remedy derived from the Indians, who applied it to painful tumors, using the decoction as a wash in inflammatory swellings, painful hemorrhoidal affections, and ophthalmias. A cataplasm, and a tea of the leaves, as an astringent, were employed in hæmatemesis. The steam practitioners also administer it in irritable hemorrhoids,

and during the bearing-down pains attending child-birth. No analysis has been made, but as it probably contains sedative and astringent principles, attention is directed to it. The curious reader may consult, besides the paper in Hutton's "Mathematics," on the wonderful properties of the witch-hazel in detecting water, a recent one in Patent Office Report on Agriculture, p. 16, 1851. This is from Prairie du Chien, by Mr. Alfred Burnson, and contains some remarkable statements of the certainty of finding water by the divining rod. Some electrical and telluric influences are hinted at—*Credat Judæus!* Persons living in the upper districts of South Carolina assume to use the rod with success.

CORNACEÆ. (*The Dogwood Tribe.*)

Cornus Florida, L. Dogwood. Well known; diffused in rich shady lands; Newbern; Va.

Drayton's View S. C. 63; Bell's Pract. Dict. 152; Barton's Collec. 12; Eberle, Mat. Med. 303; Chap. Therap. and Mat. Med. ii, 438; Ell. Bot. i, 208; Pe. Mat. Med. ii, 753; U. S. Disp. 277; Ed. and Vav. Mat. Méd. 197; Am. Journal Pharm. vii, 114; Royle, Mat. Med. 422; Ball. and Gar. 310; Mér. and de L. Dict de M. Méd. iv, 436; Big. Am. Med. Bot. ii, 73; Shec. Flora Carol. 449; Thacher's Disp. 203; Walker's Inaug. Diss. Phil. 1803; Lind. Nat. Syst. Bot. 49; Frost's Elems. Mat. Med. This well known plant possesses tonic and anti-intermittent properties, very nearly allied to those of cinchona; in periodic fevers, one of the most valuable of our indigenous plants. "Dr. Gregg states that, after employing it for twenty-three years in the treatment of intermittent fevers, he was satisfied that it was not inferior to Peruvian bark." Generally given in conjunction with laudanum. It also possesses antiseptic powers. In the recent state, it is less stimulating than the cinchona bark, but it affects the bowels more; the dried bark is the preferable form. The fresh bark will sometimes act as a cathartic. It is more stimulating than thoroughwort (Eupatorium), and, therefore, is less appli-

cable during the hot stages of fever. According to Dr. Walker's examination, the bark contains extractive matter, gum, resin, tannin, and gallic acid; and Dr. Carpenter announces in it a new principle, cornine. Dr. S. Jackson also, from experiment, is satisfied that it contains a principle analogous to quinia. It has been exhibited by Dr S. G. Morton in intermittent fever, with success. Griffith, in his Med. Bot. 347, mentions that the infusion of the flowers is useful as a substitute for chamomile tea; for analyses, see Am. Journ. Pharm. i, 114; and Phil. Journal Med. and Phys. Sci. xl. Dose of the dried bark in powder, is twenty to sixty grains; the decoction is made with one ounce of the root to one pint of water, or the extract may be employed; alcohol also extracts its virtues. The ripe fruit, infused in brandy, makes an agreeable and useful bitter, which may be a convenient substitute for the article prepared in the shops. Barton says, in his Collections, that the bark is valuable in a malignant disorder of horses called yellow water; from the gallic acid it contains a good writing ink may be made, and from the bark of the fibrous roots the Indians extracted a scarlet color. Lindley mentions that the young branches, stripped of their bark, and rubbed against the teeth, render them extremely white. It is often employed by the common people in South Carolina for this purpose.

In our present need of astringent antiperiodics and tonics, the dogwood bark powdered will be found the best substitute for Peruvian. Internally and externally, it can be applied wherever the cinchona barks were found serviceable. The dogwood bark and root, in decoction, or in form of cold infusion, is believed by many to be the most efficient substitute for quinine, also in treating malarial fevers; certainly, it might be used in the cases occurring in camp, to prevent the waste of quinine, as it can be easily and abundantly procured.

Dr. Richard Moore, of Sumter district, informs me that he not only finds it efficient in fevers, but particularly use-

ful, with whisky or alcohol, in low forms of fevers, and dysentery occurring near our river swamps.

During convalescence, where an astringent tonic is required, this plant supplies our need. See *Eupatorium* (boneset) and *Lirodendron*. These, with the blackberry and chinquapin as astringents, the gentians and pipsissewa as tonics and tonic diuretics, the sweet gum, sassafras, and bené for their mucilaginous and aromatic properties, and the wild jalap (podophyllum) as a cathartic, supply the surgeon in camp with easily procurable medicinal plants, which are sufficient for almost every purpose. Nitrate and bi-carbonate of potash are most required, and with calomel, may be procured from abroad. Our supply of opium can be easily procured by planting the poppy, and incising the capsules. Every planter could raise a full supply of opium, mustard, and flax seed. The wood of the dogwood, like the willow, is preferred in making gunpowder. See *Salix*. A tonic compound, as advised by the herbalists, is made with the bark of the root of dogwood, colombo (*Frasera*), poplar, each six ounces; bark of wild cherry, six ounces; leaves of thoroughwort, four ounces; cayenne pepper, four ounces—sifted and mixed. Dose, a teaspoonful, in warm or cold water, repeated. It is stated in the "Newbern Progress" "that a ripe dogwood berry taken three times a day, before meals, will cure ague and fever.

My friend, Professor "F A. P.," contributes the following to the Charleston *Courier*. The Dogwood bark, powdered, may be used in place of the Peruvian mentioned:

Dutch Remedy for Fever and Ague.—As quinine is very scarce, it may not be unprofitable, both to our armies and to private families, to revive the memory of an ancient remedy, which was in almost universal use before the introduction of the former drug. It was known by the name which heads this article, and has been used from time immemorial among the Huguenot families of the Santee, among whom there is a tradition that it was brought to this country by the ancestor of one of the families, who was a

physician. The remedy quoted below is copied from an old receipt book. Though not a professional man, I can vouch for its efficacy when it was in vogue.

The Recipe.—Two ounces of Peruvian bark, two ounces of cream of tartar, sixty cloves.

Manner of Using It.—These ingredients are to be rubbed together in a mortar. The mixture to be divided into twenty-four doses, four of which (mixed in water) are to be given the first day, four on the second, and two on every succeeding day, until the whole shall have been taken. It is probable that the disease will be arrested on the second or third day, but the object in taking the whole prescription is to complete the cure by its tonic property.

The berries of the dogwood have also been highly recommended—given as a remedy for fever in place of quinine (1862). One or two given in the form of pill.

The wood is compact, heavy, fine grained, and susceptible of a brilliant polish. It is used on our plantations wherever a hard wood is required, as in making wedges, the handles of light tools, mallets, plane stocks, harrow teeth, hames, horse collars, etc. Michaux states that the shoots, when three or four years old, are found proper for the light hoops of small portable casks. In the Middle states the cogs of mill wheels are made of dogwood. The branches of the tree are disposed nearly in the form of crosses. *N. Am. sylva.* Farmer's Encyc. I have used the dogwood for engraving. See "Amelanchier" in this volume.

Cornus sericea, Ph. Red willow; swamp dogwood. Elliott says it grows in the mountains of South Carolina; sent to me from Abbeville district, by Mr. Reed. Fl. June.

Griffith, Med. Bot. 349. It possesses properties quite similar to those of the C. florida, but it is more bitter and astringent. Mr. R. informs me that it is employed to a great extent in domestic practice in Abbeville. According to B. S. Barton, the bark was considered by the Indians a favorite combination with tobacco for smoking. The

young shoots were used to make coarse baskets; and they extracted a scarlet dye from these and the roots.

Cornus sanguinea, L. Grows, according to Elliott, in the valleys among the mountains. Fl. May.

Dict. de Méd. de Férus. ii, 737; Mathiole, Comment. ii, 119; Journal de Chim. xxxviii, 174, and xl, 107. See, also, Journal de Pharm. for an account of the oil extracted from it. M. Murion says they afford one-third of their weight of a pure and limpid oil, used for the table and for burning. A case of hydrophobia was said to have been cured by it. Griffith, Med. Bot. 349. There also exists in this, as in the others, a red coloring principle, soluble in water alone.

Cornus stricta. Grows in swamps near Charleston; Newbern. Shec. Flora Carol. 449.

LORANTHACEÆ.

Bark usually astringent; berries contain a viscid matter; plants possess the power of rooting in the wood of others.

Viscum verticillatum, L. The V verticillatum of Ell. Sk. is not that of Linn T. and Gray; N A. Flora. Mistletoe. Diffused; grown on oaks; Newbern. Fl. May.

Mér. and de L. Dict. de M. Méd. vi, 860; Lind. Nat. Syst. Bot. 50; Le. Mat. Med. ii, 456; Journal de Méd. lxx, 529; Eberle, Dis. of Children, 522. Dr. Barham, in the Hortus Americanus, says that the fruit of the mistletoe cures epilepsies, pleurisies, coup de soleil, etc. Dém. Élém. de Bot. iii, 556; employed in paralysis. Thornton's Fam. Herb. 333. Fothergill, Dr. Wilson, and Gilbert Thompson use it "with great effect in epilepsy." So, also, Dr. Fraser, who published a work on it. Wade's Pl. Rariores, 82. Eberle, "Dis. of Children," alludes to its employment in infantile epilepsy. Some writers refer to the European species; but this is supposed to be identical with it. The

seeds contain a viscid substance resembling bird-lime in appearance, which is insoluble both in water and in alcohol. In Dr. Hunter's edition of Evelyn's Sylvia, it is said to prevent the rot in sheep. Bird-lime was formerly made from the berries of the mistletoe of oak, which were first boiled in water, then pounded, and the water poured off in order to carry away the seeds and rind. For process, see "Holly" (*Ilex opaca*); also, Wilson's Rural Cyc.: "Bird-lime" and "Bird catching."

CUCURBITACEÆ. (*The Gourd Tribe.*)

This order is closely allied to the Passifloraceæ, and is found in most abundance in hot countries. Most of them are valuable articles of food, but are pervaded by a bitter laxative quality, which in the colocynth gourd becomes an active purgative principle.

Cucumis citrullus. Watermelon. The juice of the melon by boiling may be converted into a palatable syrup for table use, and one of the best substitutes for molasses. No doubt, like the ripe fig, beet, and other saccharine substances, it may easily be converted into vinegar, and should be added to the vinegar cask. The diuretic properties of the seeds of the watermelon are well known—almost the same may be said of the pumpkin, which is used as an article of food for man and beast in many of the Confederate States. The harder portions of both melon and pumpkin are used in making preserves by our Southern matrons.

Cucumis pepo, W Pumpkin. Cultivated very successfully in South Carolina.

Shec. Flora Carol. 488. The seeds afford an essential oil, which might be made of some value; when triturated with water, they furnish a cooling and nutritive milk, and when boiled to a jelly, they are said by Bechstein to be a very efficacious remedy for retention of urine. The fruit is

much used on the plantations in this state, as an article of food both for men and animals; pies and preserves of an agreeable flavor are made of it. See Stille's Mat. Med., and recent medical works for the singularly useful qualities of the seeds, as recently applied by Johnson and others, in medicine. The fruit which should have been dried as a winter provision for our army, has been converted into brandy, and dried fruit will probably be very scarce. An excellent substitute may be found in the pumpkin. Cut into slips and dried either in the sun or in a dry room, it is said to be little inferior to dried apples. The muskmelon (Cucumis melo) and cucumber (C. sativus) are also cultivated in South Carolina.

Cucurbita lagenaria, L. Gourd; calabash. Grows in cornfields, and along fences; vicinity of Charleston; Richland. Gibbes. Collected in St. John's. Fl. May.

Linn. Veg. Mat. Med. 180; Ed. and Vav. Mat. Méd. 563; Le. Mat. Med. i, 379; Mér. and de L. Dict. de M. Méd. ii, 492. An infusion has been found useful in inflammation of the urinary passages, and the seeds have been employed in rheumatism, strangury, and nephritis. Shec. Flora Carol. 479. "Water, which has lain for some time in the fruit of this plant, becomes violently emetic and cathartic." The shells of the dried fruit are sometimes so capacious as to contain four gallons of water; convenient receptacles, water-flasks, dippers, milk-pans, etc., are made of them. They must first be deprived of their acrid principle by boiling; moulds for buttons are fashioned out of them, and they are much used for these purposes by the negroes on the plantations. The watermelon (C. citrullus) grows luxuriantly in South Carolina. It is well known that the juice of the latter is diuretic, and the seeds, by trituration, or by being boiled in water, afford a demulcent and diuretic drink. The various species of squash are likewise cultivated here.

Melothria pendula, L. Creeping cucumber. Grows in rich,

shaded soils; collected in St. John's, Charleston district. Fl. June.

Journal de Chim. Méd. iii, 498; Mér. and de L. Dict. de M. Méd. iv, 322; Griffith, Med. Bot. 311. The seeds act as a drastic purgative — a half a one is a dose for an adult. Martius states that three or four will act powerfully on a horse. Journal de Chim. loc. sit. sup.

CACTACEÆ. (*The Indian Fig Tribe.*)

Fruit very similar in its properties to that of the currant tribe; often refreshing, sometimes mucilaginous and insipid.

Opuntia vulgaris, Mill. T. and Gray. } Grows in dry pas-
Cactus, opuntia of Ell. Sk. } tures; Newbern. Fl. May.

Mér. and de L. Dict. de M. Méd. vi, 11. The fruit is said to be eatable; the leaves cut transversely are applied to tumors as a discutient; the decoction is mucilaginous, and I am informed that it is much used in Alabama as a demulcent drink in pneumonic and pleuritic inflammations. Its cultivation has been recommended on account of the cochineal insect, which is said to feed on it. Mr. Wm. Summer, of South Carolina, contributes the following to the list of our "expedients":

TO MAKE HARD TALLOW CANDLES.—To one pound of tallow take five or six leaves of the prickly pear, (*Cactus opuntia,*) split them, and boil in the tallow, without water, for half an hour or more; strain and mould the candles. The wicks should have been previously dipped in spirits of turpentine and dried.

If the tallow at first is boiled in water, and the water changed four or five times, it will be bleached and rendered free from impurities. Then prepare, by frying with prickly pears, to harden it.

In this way we have made tallow candles nearly equal to the best adamantine, and, at the same time, have the con-

solation of knowing that we are independent of the extortioners, who are next of kin to the villainous abolitionist makers of stearine candles in the North.

The prickly pear has been used (1862) for hardening tallow by the ladies of St. John's, S. C., with satisfactory results. One pound is added to four of tallow; a larger quantity makes the candles too brittle. It takes the place of wax.

Cactus cochinilifer. Elliott says that it is probable that other species exist, but he does not include this in his Sketches of the Bot. of South Carolina. Shecut, however, in his Flora Carol. 319, remarks, that "we are indebted to Dr. Garden, of South Carolina, for the discovery of this tree here," well known as the one upon which the cochineal insect feeds. T. and Gray, however, do not include it in their N. A. Fl. The fruit tinges red the urine of those who eat it; and the leaves, rubbed up with hog's lard, are useful as a topical application to prevent mortification.

CRUCIFERÆ. (*The Cruciferous Tribe.*)

Lindley states that the universal characteristic of this order is the possession of antiscorbutic and stimulant qualities, combined with an acrid flavor. The species contain a great deal of nitrogen, to which is attributed their animal odor when rotting.

Lepidium Virginicum, L. Peppergrass; Virginian cress. Wet places. Common.

It is suitable to be used in winter and early spring salads, but is far less in request than some of the other cresses. Sowings should be made in light, dry earth, the beds protected with dry litter during severe winter. Rural Cyc.

Camelina sativa, Crantz. Gold of Pleasure. Referred to in Chapman's Botany of Southern states, p. 30, as introduced, growing in cultivated fields.

Paper in P O. Report on Agriculture, 1851, p. 51, on the

"Camelina sativa—a new *oil* plant." In some parts of the world it is cultivated for its stems, which yield a fibre applicable for spinning, and for its oleiferous seeds. Mérat says cultivated for this purpose in Flanders.

Mr. Wm. Taylor, F L. S., has recently drawn the attention of agriculturists and others to this as an *oil plant*, adapted for feeding cattle, and for other purposes. He says that the soil best adapted for its cultivation are those of a light nature, but a crop will never fail on land of the most inferior description. It has been found to flourish this year on sandy soils, where no other vegetable would grow, and independent of the drought, the plants have grown most luxuriantly, yielding a large and certain crop. When grown upon land that has been long in tillage and well farmed, the crop will be most abundant. The best time for putting in the seed is as early as possible in the spring months, say from the middle of March or the middle of April to June, and for autumn sowing to August; and the quantity per acre required, fourteen pounds; and may be either drilled or broadcast, but the drilled method should be preferred. If drilled, the rows must be twelve inches apart. As soon as the plants have grown five or six inches high, a hand or horse hoe may be used to cut up the weeds between the rows, and no further culture or expense will be required. If sown early, two crops may be frequently obtained in one year, as it is fit for harvesting in three months after the plant makes its first appearance. Or another important advantage may be obtained: if seed is sown early in March, the crop will be ready to harvest in the beginning of July, and the land fallowed for wheat or spring corn; also when barley or small seeds cannot be sown sufficiently early, this may be put in with great success. It is a plant that may be cultivated after any corn crop, without doing the least injury to the land, and may be sown with all sorts of clover; the *leaves* of the *gold of pleasure*, being particularly small, afford an uninterrupted growth to every plant beneath it, and the crop being removed early, the clover has time to establish itself.

The grower of this invaluable production is in all seasons secure of his crop, inasmuch as it is not subject to damage by spring frosts, heavy rains, and drought, and, above all, the ravages of insects, more particularly the cabbage plant louse (aphis brassica), which so frequently destroys rape, turnips, and others belonging to the cruciferæ order, when coming into blossom. The seed is ripe as soon as the pods change from a green to a gold color. Care must then be taken to cut it off before it becomes too ripe, or much seed may be lost. When cut with a sickle, it is bound up in sheaves, and shocked in the same manner as wheat. The process of ripening completed, it is stacked or put in a barn, and threshed like other corn. The expense of these crops cannot be very great, either in the preparation and culture of the land or in the management in securing the produce afterward; but when grown with care and in good season, the produce will mostly be very abundant—as high as thirty-two bushels and upward to the acre.

The cultivation of this plant for the seed would repay the farmer; an abundance of chaff would be produced, which would be of infinite service for horses or for manure. In a grazing country like England, where vast sums are annually expended for foreign oil cake, the *gold of pleasure* will soon be found an excellent substitute under manufacture, and consequently a grower would find a good remuneration in cultivating the seed. The plant may be considered a valuable production of the earth. A fine oil is produced for burning in lamps, in the manufacture of woollen goods, in the manufacture of soaps for lubricating machinery, and for painters. The oil cake has been found highly nutritious in the fattening of sheep and oxen, as it contains a great portion of mucilage and nitrogenous matter, which, combined together, are found very beneficial in developing fat and lean. From the experiments above related, it is abundantly proved that it does not suffer from the severest frosts, its foliage not being injured. It is not infested by insects, nor does it exhaust the soil.

The gold of pleasure has been cultivated by several practical agriculturists, who highly approve of the new plant. For all these reasons it is hoped that every farmer will avail himself of this valuable discovery as a remunerating rotation crop. Mr. Taylor adds that one acre cultivated with these plants yield thirty-two bushels of seed, from which five hundred and forty pounds of oil are obtained; so that the camelina seems to exceed the flax in its produce of seed, oil, and cake per acre. The seed is extremely rich in nutriment. I know of no seed superior to it for feeding cattle. The oil obtained by expression is sweet and excellent, especially for purposes of illumination. From the very small quantity of inorganic matter in the seed, it will be evident that the seed cake must be of a very nutritious character, being merely the seed deprived of a portion of its water and oily matter. We have examined some of the oil obtained from the seed of the *camelina sativa*, and which has been recently sent to several medical men by Mr. Taylor, under the belief that it possesses valuable medical properties. It is of a yellow color, and smells something like linseed oil. Finding it of service in relieving the incessant cough of a cat, Mr. Taylor has extended the use to the human subject, and states that it has cured several persons affected with diseased lungs and *asthma*.

In a brief notice, P O. Reports, 1850, is the following statement: "Camelina sativa (*Miagrum sativum*) an annual from France, produces a finer oil for burning than rape, having a brighter flame, less smoke, and scarcely any smell. It succeeds well in light, shallow, dry soils; and in our Middle and Southern states it would probably produce two crops in a season. Besides the use of the seeds for oil, the stems yield a coarse fibre for making sacks and a rough kind of packing paper, and the whole plant may be employed for thatching. The culture is similar to that for flax." See "Linum" in this volume.

Capsella Bursa-pastoris, Mœnch and T. and G. }
Thalspi. Linn. and Ell. Sk. } Grows in damp pastures; collected in St. John's; Newbern. Fl. May.

Ray's Cat. Plantarum, 47; Bergius, Mat. Med. ii, 389; Le. Mat. Med. i, 243: Mér. and de L. Dict. de M. Méd. vi, 732. It astringes and constipates; hence employed in dysentery, diarrhœa, and bloody urine; the juice placed on a piece of cotton, and inserted in the nostril, will arrest hemorrhage. "Externe vulneribus solidandis adhibieter nec sine successu." Fl. Scotica, 342; Linn. Veg. M. Med. 128.

Sisymbrium nasturtium, L. and Ell. Sk. } Cress. Nat. in
Erysimum of Bot. } the upper part of
this state; vicinity of Charleston. Bach. Fl. March.

Fl. Scotica, 351. The young leaves furnish an agreeable salad; the plant was esteemed useful as an antiscorbutic, and was employed in removing obstructions of the liver, viscera, jaundice, etc. Thornton's Fam. Herb. 618. The juice acts as a stimulant and diuretic. Haller says: "We have seen patients in a deep decline cured by living almost entirely on these plants." According to Tournefort, the juice, snuffed up the nose, cured cases of polypus of that organ. See Edinburgh New Disp., Flora Med. iii, 138; Pliny, lib. xix, chap. 8; xx, chap. 13. Hoffman and Cullen spoke highly of it as furnishing a mucilaginous application for the heads of infants affected with eruptions. It was acknowledged to have an effect upon maladies of the skin, engorgement of the abdominal viscera when the blood is depraved, in feeble digestion, etc. U. S. Disp. 1226. This plant is also vaunted in incipient phthisis, in chronic catarrhs, in maladies of the bladder and kidneys, and in hysterical affections. It contains a very bitter and odoriferous essential oil—the seeds yielding 55 per cent. of fixed oil. See de Cand. Phys. Veg. i, 298; Journal Gén. de Méd. xxviii, 136; Barbier, M. Méd. 242. Moreau asserts that vertigo and discoloration of the face are produced in those eating this plant; but this is an effect unnoticed by others.

Sisymbrium officinale, Fide Gray. } Hedge mustard.
Erysimum " Lin. and Ell. Sk. }
This is not included by Mr. Elliott in his Sketches of

the Plants of South Carolina. It was one of the specimens sent to Professor Gray, and determined by him; collected in St. John's, Berkley; Charleston district. The herb is said to be diuretic and expectorant; the seeds possess considerable pungency, and have been recommended in chronic cough, hoarseness, and ulceration of the mouth and fauces; the juice of the plant in honey or the seeds in substance may be used.

Sisymbrium amphibium, L. Water radish. Rare; roots immersed; collected on causeway near Brunswick; Pl. T. W Peyre's, in St. John's; vicinity of Charleston.

Mér. and de L. Dict. de M. Méd. vi, 365. Recommended for tænia by Didelot, and in the old works as an antiscorbutic. Mérat says the "young leaves are eatable in the spring; probably possessed of similar properties with the S. nasturtium."

Nasturtium officinale, R. Br. Water cress. Introduced. Ditches Florida, and northward. Chap.

This plant came into pretty high favor about a century ago as a spring salad; and it soon obtained preference to all other spring salads on account of its agreeable, warm, bitter taste, and for the sake of its purifying, antiscorbutic, and diuretic properties. It was greedily gathered in all its natural habitats within some miles of London for the supply of the London market, and eventually became an object of regular, peculiar, and somewhat extensive cultivation; see methods, etc., Wilson's Rural Cyclopædia.

Sinapis nigra. Mustard. Cultivated in South Carolina. Therapeutic virtues well known.

Mustard is a hardy annual, cultivated as a small salad for greens, and for the seed, which are extensively employed for medicinal purposes. The demand for the production of this plant, on account of the value of the seeds as a local irritant, should induce every planter and farmer to grow it. Enormous quantities are required to supply the armies;

besides that, it is largely consumed in every household. The white mustard I have seen cultivated on our plantations, and, maturing early in June, is fully equal in strength to the imported article. At the present time (June, 1862) the seeds are sold for more than a dollar a pound. It is very easily ground or powdered, and used like English mustard.

The common table mustard is prepared from the flour of the seed. For salad, it is sown thickly, and used like common cress. "Sow early in the spring in two feet drills, and thin to six inches. The crop must be gathered before it is fully ripe, on a cloudy day or early in the morning, to prevent the seed from shelling out."

The "*white*" is usually prepared for salad, and the seeds are eaten whole as a remedy for impaired digestion. The leaves of this are light green, mild and tender when young; the seed light yellow The "black" or "brown" is a larger plant, with much darker leaves. "Seeds brown, and more pungent."

For the medical uses of these plants, any of the works on the materia medica will supply information under the head "Sinapis."

Mustard seed oil, says Ure, in his Dict. Arts and Sciences, p. 285, concretes when cooled a little below 32° Fahrenheit. The white or yellow seed afford thirty-six per cent. of oil, and the black seed eighteen per cent.

The reader interested in the culture of mustard can find some information in Wilson's Rural Cyc. He quotes from a prize essay by T. C. Burroughes in 7th volume Royal Ag. Soc. The field culture of both the white and black mustard is practised for the production of their seeds, with a view either to the expression of oil from them, similar to that of cole, and rape, and poppy, or to the obtaining of oil cake for the use of cattle, or to the grinding them into the well known condimental and medicinal flour of mustard, or to several other economical and pharmaceutical purposes. The crop is reaped, and tied in sheaves like wheat, and is afterward threshed out upon cloths in the

field in the same manner as cole. White mustard is generally laid in handfuls on the shuttle, and not tied up. The black mustard is hardier than the white. The quantity of oil obtained from any given weight of black mustard seeds is greater than that obtained from the same weight of coles; but the oil cake is slightly purgative, and requires to be given to cattle with caution, and is commonly ground and sprinkled on their chaff. Wilson also states that the flour of mustard from the seeds of black mustard is much more pungent, and of much finer quality than that from the seeds of white mustard. It is still the kind most commonly used in France; but it requires to be manufactured by a nice mechanical process of removing the outer skins of the seeds, or else it has a grayish or very dark color; and, in fact, it is never so prepared as to be entirely freed from its grayishness. The flour of white mustard is generally used in Britain in consequence of its fine color, and the superior facility of manufacturing it. It is often mixed with the black. Rural Cyc. The method of depriving the black mustard seed of its envelope I have been unable to obtain. Warm water is always the best addition to mustard to elicit the volatile oil. Vinegar lessens its pungency. See Trousseau's Experiments. Mustard has been highly recommended as a substitute for the spring colza and other plants, to be used in the production of oil. "Both species," white and black, yield oil, Thaër says in his Principles of Agriculture, "which is well adapted for burning; and also, when well purified, for the use of the table. A quintal of mustard seed yields from thirty-six to thirty-eight pounds of oil. The biting acridity of the seed exists not in the oil, but in the integument; and the English mustard, which is celebrated for its strength, is said to be made from cakes from which the oil has been expressed." Among the plants mentioned by Thaër as valuable for the oil in their seeds, are the oily radish (*Raphanus chinensis oleiferus*), the sunflower, and the common poppy, *Papaver somniferum;* the oil from the white-seeded variety is preferable on account of its taste. See Thaër

also, for descriptions of the cultivation of flax seed, hemp, hops, madder, beets, etc. Many plants, the seeds of which yield oil, are used in making oil cake for agricultural purposes, and as food for animals. The sunflower, which yields a large quantity of seed to the acre, will, it is said, furnish one gallon of oil to the bushel. See "Cotton," "Flax," etc., in this volume.

CAPPARIDACEÆ. (*Caper Family.*)

CAPPARIS SPINOSA. (*Caper Tree.*)

This plant, cultivated in Greece, Ionian isles, France, Italy, etc., has also been introduced into this country. The flower buds are collected and put into salt and vinegar. See Patent Office Report, 1855, p. 285, for a brief notice of the cultivation and preparation. In the Confederate States we have the *C. Jamaicencis*, Jacy, and *C. cynophallophora*, L. growing in South Florida. It is possible that they may be used as substitutes for the foreign caper.

VIOLACEÆ. (*The Violet Tribe.*)

Roots more or less emetic; a property which prevails to a greater extent in the South American species, which are generally less herbaceous.

Viola pedata, Mich. Found in the upper districts; sparingly in the lower; Richland. L. Gibbes. Fl. May.

U. S. Disp. 753; Griffith, Med. Bot. 140. The roots of nearly all the species of this genus possess a nutritive and an emetic principle, called violine, allied to that of ipecacuanha, but more uncertain in its operation. This is said to replace the European plant, and, according to Dr. Bigelow, is valuable as an expectorant and demulcent in pectoral affections.

Viola arvensis, D. C.

Griffith, Med. Bot. 141. This and the V tricolor have received considerable attention from European writers,

especially the German. Strack made them the subject of a discussion in 1776, and since then the observations of Metzer, Cloquet, and others have shown that they are possessed of much efficacy in the treatment of cutaneous diseases, and especially of that obstinate and unpleasant eruption, crustea lactea. The fresh plant, or its juice is to be used, as drying destroys its active qualities. Strack states that, when the remedy has been given for some time, the urine becomes extremely fetid, smelling like that of the cat; op. cit. supra. Attention is invited to it. See V tricolor.

Viola tricolor, Linn. Heartsease. Cultivated in gardens. Fl. May.

Trous. et Pid. Traité de Thérap. et de Mat. Méd. ii, 15; U. S. Disp. 743; Le. Mat. Med. ii, 453; Griffith, 40; Thornton's Fam. Herb. 731. It was formerly considered a valuable remedy in epilepsy, ulcers, and scirrhus. See Störck de V tricolor, Erlang. 1782. Metzer de crustea lactea infantum, ejusdem que remedio præmio coronavit. 1776. Lond. Med. Journal. A handful of the fresh, or one ounce and a half of the dried herb, was boiled in milk, which was taken twice a day; bread soaked in this was also applied to the affected parts. It was much boasted of as a remedy in the latter disease; see Mér. and de L. and the Art. V arvensis. Bergius, speaking of these two, says that half an ounce in twelve of water produces a consistent and valuable demulcent jelly.

Viola palmata, Linn. Hand-leaved violet. Collected in St. John's; vicinity of Charleston; Newbern. Fl. March.

Ell. Bot. 300, Med. Notes. The plant is very mucilaginous. It is employed by negroes for making soup, and is commonly called wild okra. The bruised leaves are used as an emollient application.

Viola cucullata, Ait. Common blue violet. Grows in damp pine lands; collected in St. John's; vicinity of Charleston. Fl. May

Le. Mat. Med. i, 223. Probably possessed of similar properties with the others; a decoction is given to children in eruptive diseases. These plants might very conveniently be used in domestic practice, and we would invite attention to their further employment.

DROSERACEÆ. (*The Sun Dew Tribe.*)

Plants generally slightly acid; acrid and poisonous to cattle.

Drosera rotundifolia, Linn. Sun dew. Grows in damp spots in the low country of South Carolina; Richland; collected in St. John's; Newbern. Fl. June.

Bull. Plantes Vén de France. Vicat mentions it as an active and corrosive plant: the liquor which exudes from the hairs destroying warts, corns, etc. Dém Élém. de Bot. ii, 334. M. Geoffroi asserts that it is a valuable pectoral, employed in ulcers of the lungs, asthma, etc.; the infusion being generally used. The juice has been recommended in hydrops, diseases of the kidneys, ophthalmias, etc. Mér. and de L. Dict. de M. Méd. ii, 690. Shec., in his Flora Carol, 519, confirms the opinion in reference to the corrosive property of the juice, and adds that, with milk, it furnishes a safe application for removing freckles; any part of it will curdle milk. Fl. Scotica, 109. It is thought to be very injurious to sheep, producing in them consumption or rot. M. Berlace affirms (Esquiss. Hist. Bot. Aug.) that cattle avoid it on account of an insect (Hydra hydatula) which feeds on it. This plant is quite diminutive, and has heretofore received very little attention; we see no mention made of it in our Am. Disps.

PASSIFLORACEÆ. (*The Passion Flower Tribe.*)

Passiflora lutea and incarnata, Linn. May apples; passion flowers. Grow in pastures.

The fruit of these beautiful climbing plants contains a sweetish, acid pulp, and is eatable. Several of the species are employed in medicine; but these have received no

attention, being more remarkable on account of the structure of their flowers. One is quite diminutive.

HYPERICACEÆ. (*The Tatsan Tribe.*)

The juice of many of the species is slightly purgative and febrifugal.

Ascyrum Crux Andreæ, *W.* } Peterwort. Collected in
" *multicaule*, *Mx.* } pine land soils; St. John's; vicinity of Charleston; Newbern. Fl. July.

The infusion of the bruised root and branches of this plant was used by an Indian with success in the case of a female, under our observation, with an ulcerated breast, which had resisted all other attempts at relief. We have since seen it employed with entire satisfaction, on the person of an infant, having a painful enlargement of the submaxillary gland. No further opportunity has been afforded of ascertaining its properties with certainty; but it seems to be possessed of some power as a resolvent in discussing tumors, and reducing glandular enlargements; given internally, and applied topically. The taste is somewhat acrid. We would invite further examination.

Hypericum perforatum, L. St. John's-wort. Sparingly naturalized in Confederate States.

It was greatly in vogue at one time, and was thought to cure demoniacs. The decoction also given in hysteria and suppressed menstruation. Thornton's Family Herbal, 67. The coloring matter gives a good dye to wool.

The plant called St. John's-wort, which I think is *Ascyrum cruxandreæ*, growing abundantly throughout our country, is popularly regarded as of great value, bruised and applied in the healing of wounds, and as a discutient.

Wilson states that its leaves and flowers are strongly resiniferous or oleiferous, and emit a powerful odor when rubbed; it bleeds under very slight compression or wounding, and imparts a blood-red color to any spirituous or oleaginous substance with which it is mixed, and was for-

merly supposed to possess the power of healing wounds, bruises, and contusions. It is the *Fuga Dæmonium*, he adds, of old herbalists, and was formerly held to influence conjurations and enchantments. It yields a good yellow dye to woven fabrics, from its flowers, and a good red dye from its leaves. The juice of the hypericums are often exceedingly similar to gamboge. Rural Cyc. The plant has a resinous odor, and Dr. Darlington says is believed to produce troublesome sores on horses and horned cattle, especially those which have white feet and noses. The dew which collects on the plant appears to become acrid. Flora Cest. Farmers' Encyc. I found the same impression prevailing in Powhatan county, Va. A tincture of the flowers and leaves are used in stomach complaints.

Hypericum sarothra, Mich., T. and G. } Pine weed;
Sarothra gentianoides Linn. and Ell. Sk. } orange grass.
Grows in dry pastures; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 226; Journal de Méd. lxxx, 360. It is employed as an aperient in inflammatory affections.

ACERACEÆ. (*The Sycamore Tribe.*)

Acer rubrum, Linn. Red maple. Diffused.

Shec. Flora Carol. 80. The wood is much used in the manufacture of Windsor chairs, gun-stocks, etc.; the grain is sometimes beautifully curled. In a communication received from I. Douglass, M. D., of Chester district, S. C., his correspondent, Mr. McKeown, states that the country people consider a strong decoction of the bark, with white sugar, used as a wash, a safe and certain cure for ordinary ophthalmia. Some of the inhabitants of the Western states make sugar by boiling down the sap of the white maple, which, however, like that of the red maple, yields only half the proportion of sugar obtained from the juice of the sugar maple. Farmer's Encyc.

Acer saccharinum, Linn. Sugar maple. Var. *Floridanum*, found in South Florida. Chap. Diffused, but more abundant in the upper districts; found sparingly at the head waters of Cooper river; St. John's, Berkley; Newbern. Fl. Feb.

Shec. Flora Carol. 90. Pure flake manna has been discovered in this species. Sugar extracted from it is an article of trade; it is employed medicinally also. The wood is esteemed in the manufacture of saddle-trees. The grain of the wood is fine and close, and when polished it has a silky lustre.

The timber of old trees is extensively used in America for inlaying mahogany; and it possesses, in an eminent degree, the same kind of bird's-eye markings which distinguish the timber of the Norway maple. The wood is heavy and strong, but not durable. The ashes are very rich in alkaline matter, and furnish a large proportion of the potash which is imported to Europe from New York and Boston. Rural Cyc. I have seen the sugar maple boxed as low down as Middle Virginia, but have never heard of any sugar being made from the tree in states south of Virginia. Maple and sweet gum barks, with copperas, will dye a purple color; maple, red oak bark, and copperas to fix it, will dye dove color; maple, with bark of black walnut (*Juglans nigra*), gives a brown color; sweet gum, with copperas, yields a color nearly black. See, also, "*Quercus*," "*Hopea*," etc.; see Boussingault's Treatise, "Rural Economy, in its Relation to Chemistry, Physics, etc.," p. 125, for valuable instruction on cultivation, production, etc., of sugar from maple, beet, etc; also, Ure's Dictionary of Arts, Manufactures, and Mines, article "Sugar, beet, etc." Wilson, in his Rural Cyc., article "Acer," which the reader may consult, states that the sap of the maple also contains ammonia, and has, therefore, all the conditions for forming the nitrogenous components of the branches, leaves, and blossoms; and in proportion as these parts of the tree are developed, it gradually loses its ammonia, and when they are completely formed it ceases to flow. Rural Cyc. Liebig dis-

covered that ammonia was emitted from this juice when mixed with lime. The sugar crystallized spontaneously The American practice with the sugar maple is to bore two auger holes, three-fourths of an inch in diameter, and half an inch deeper than the bark, in an obliquely ascending direction, on the south side of the tree, at the height of about eighteen or twenty inches from the ground, in February or March, while the snow is on the ground, and the cold is still intense, and to insert into the holes elder or sumac tubes, partially laid open, eight or ten inches in length, and three-fourths of an inch in diameter, communicating at the lower end with troughs of two or three gallons in capacity, for the reception of the sap. Four gallons are usually sufficient to yield one pound of sugar: and eight to sixteen gallons are usually obtained in a season from a single tree—this must depend upon the locality. Op. cit. I insert the following from Farmer's Encyc.:

"In a central situation, lying convenient to the trees from which the sap is drawn, a shed is constructed, called a sugar-camp, which is destined to shelter the boilers and the persons who tend them from the weather. An auger, three-fourths of an inch in diameter, small troughs to receive the sap, tubes of elder or sumac, eight or ten inches long, corresponding in size to the auger, and laid open for a part of their length, buckets for emptying the troughs and conveying the sap to the camp, boilers of fifteen or eighteen gallons capacity, moulds to receive the syrup when reduced to a proper consistency for being formed into cakes, and, lastly, axes to cut and split the fuel, are the principal utensils employed in the operation. The trees are perforated in an obliquely ascending direction, eighteen or twenty inches from the ground, with two holes four or five inches apart. Care should be taken that the augers do not enter more than half an inch within the wood, as experience has shown the most abundant flow of sap to take place at this depth. It is also recommended to insert the tubes on the south side of the tree; but this useful hint is not always attended to.

"A trough is placed on the ground at the foot of each tree, and the sap is every day collected and temporarily poured into casks, from which it is drawn out to fill the boilers. The evaporation is kept up by a brisk fire, and the scum is carefully taken off during this part of the process. Fresh sap is added from time to time, and the heat is maintained till the liquid is reduced to a syrup, after which it is left to cool, and then strained through a blanket, or other woollen stuff, to separate the remaining impurities.

"Some persons recommend leaving the syrup twelve hours before boiling it for the last time; others proceed with it immediately. In either case the boilers are only half filled, and by an active, steady heat the liquor is rapidly reduced to the proper consistency for being poured into the moulds. The evaporation is known to have proceeded far enough when, upon rubbing a drop of the syrup between the fingers, it is perceived to be granular. If it is in danger of boiling over, a bit of lard or of butter is thrown into it, which instantly calms the ebullition. The molasses being drained off from the moulds, the sugar is no longer deliquescent, like the raw sugar of the West Indies.

"Maple sugar manufactured in this way is lighter colored, in proportion to the care with which it is made, and the judgment with which the evaporation is conducted. It is superior to the brown sugar of the colonies, at least, to such as is generally used in the United States; its taste is as pleasant, and it is as good for culinary purposes. When refined, it equals in beauty the finest sugar consumed in Europe. It is made use of, however, only in the districts where it is made, and there only in the country; from prejudice or taste, imported sugar is used in all the small towns, and in the inns.

"The sap continues to flow for six weeks; after which it becomes less abundant, less rich in saccharine matter, and sometimes even incapable of crystallization. In this case it is consumed in the state of molasses, which is superior to that of the islands. After three or four days

exposure to the sun, maple sap is converted into vinegar, by the acetous fermentation. The amount of sugar manufactured in a year varies from different causes. A cold and dry winter renders the trees more productive than a changeable and humid season. It is observed that when a frosty night is followed by a dry and brilliant day the sap flows abundantly; and two or three gallons are sometimes yielded by a single tree in twenty-four hours. Three persons are found sufficient to tend two hundred and fifty trees, which give one thousand pounds of sugar, or four pounds from each tree. But this product is not uniform, for many farmers on the Ohio do not commonly obtain more than two pounds from a tree. Trees which grow in low and moist places afford a greater quantity of sap than those which occupy rising grounds, but it is less rich in the saccharine principle. That of insulated trees, left standing in the middle of fields or by the side of fences, is the best. It is also remarked that, in districts which have been cleared of other trees, and even of the less vigorous sugar maples, the product of the remainder is, proportionally, most considerable. 'Having introduced,' says a writer, 'twenty tubes into a sugar maple, I drew from it the same day twenty-three gallons and three quarts of sap, which gave seven and a quarter pounds of sugar; thirty-three pounds have been made this season from the same tree, which supposes one hundred gallons of sap.' It appears here that only a little more than three gallons was required for a pound, though four are commonly allowed."

SAPINDACEÆ. (*Soapberry Tribe.*)

Sapindus marginatus. Willd. Soapberry. Florida and Georgia, near the coast.

The skin of the fruit of *S. emarginatus* is said to be used in India for the same purposes as soap. That of the *S. saponaria*, which grows in the West Indies, is employed for washing linen, but when employed often is apt to burn and destroy it; the nuts are very smooth, and of a shining black color, and were formerly imported to England and

manufactured into buttons, which were sometimes tipped with silver, and always very durable. Wilson's Rural Cyc. Our species should be examined. It will be observed that it is very nearly related to the buckeye (*Æsculus*), the roots of which are also used for washing woollens. See, also, "*Saponaria*," in this paper.

ÆSCULACEÆ. (*The Horse Chestnut Tribe.*)

The seeds contain a great quantity of a nutritive starch; also a sufficient amount of potash to be useful as cosmetics, or as a substitute for soap.

Æsculus pavia, L. Horse chestnut; buckeye. Diffused. I have observed it in Greenville, Fairfield, and Charleston districts; vicinity of Charleston, Bach. Fl. May.

Shec. Flora Carol. 105; Griffith's Med. Bot. 214. The fruit is about the size of a small lemon, and of a beautifully polished mahogany color externally; it contains a great deal of starch. Dr. Woodhouse prepared a half a pint from the nuts, which retained its color for two years. It is superior to the famous Portland starch, and does not impart a yellow color to cloth. It is said that the washing from this is narcotic and poisonous. Dr. McDowel tried the powder of the rind, and states that ten grains were equivalent to three of opium; a strong decoction is recommended as a lotion to gangrenous ulcers. A strong decoction of the root is said to relieve toothache when held in the mouth. The fresh kernels, macerated in water, mixed with wheat flour into a stiff paste, and thrown in pools of standing water, intoxicate fish, so that they float on the surface, and may be taken; reviving, however, when placed in fresh water. I am informed that large quantities were formerly caught in this way in the swamps along the Santee river. See, also, Ell. Bot. Med. Notes. The roots are preferred even to soap for washing and whitening woollens, blankets, and dyed cottons—the colors of which are improved by the process. Satins washed in this manner, and carefully ironed, look almost as well as new.

POLYGALACEÆ. (*The Milkwort Tribe.*)

Bitterness in the leaves, and milk in the roots, are their usual characteristics.

Polygala Senega, L. Seneka snakeroot; mountain flax. Mountainous districts of S. C. Fl. July.

Thornton's Fam. Herb. 629. An active stimulant, increasing the force of the circulation, especially that of the pulmonary vessels; hence, found very useful in typhoid inflammation of the lungs. Dr. Brandreth, of Liverpool, has derived great service from its employment, in cases of lethargy, in the form of an extract combined with carb. ammoniæ. It has been given in hydropic cases, and as it sometimes provokes plentiful discharges by urine, stool, and perspiration, it is frequently the means of removing the disease after the ordinary cathartics, diuretics, and hydragogues have failed. The Indians used it in snake bites, given internally and applied topically; if beneficial, it only acts as a diffusible stimulant; it is administered, also, as a gargle in croup. A principle called senegin has been discovered in it; and one by Reschier, called polygalic acid. Anevenne is also said to have detected two: polygalic and Virgineic—the first of which will unite with bases; the second volatile, oily, nauseant, and emetic in small, diaphoretic, expectorant, and diuretic in large doses. Stephens & Church, 103. See Analysis in Journal de Pharm. xxii, 449. One of the principles referred to is said not to differ from saponine. Supplem. to the Dict. de M. Méd. by Mér. and de L. 1846, 578; M. Guibourt, in his "Abridged Hist. of Simple Drugs" (in French); Carson's Illust. Med. Bot. 1847, pt. i; L. Feneulle's Annal. Journal de Pharm. ii, 430. It has been employed in pleurisy. See Tennent's Essay on that disease; Duhame, Mém. de l'Acad. de Paris, 1739, 144; McKensie's Med. Obs. and Enquiries, ii, 288; De Haen. Ratio Medendi: F d'Ammon "sur l'emploi et l'utilité de la racine du P sénéga dans plusieurs mal de l'œil"; Annal. de Chim. de Heidelberg. Dr. Ammon, of

Dresden, in his paper, employs it in ophthalmias, after the inflammatory stage is passed; it is said to prevent the formation of cataract, and to promote the absorption of pus in hypopium; he reports two cases; it is adapted, in fact, to all cases of exudation, by its power of promoting discharge. Suite des Expériences in Bull. des Sci. Méd. xx, 241. Bretonneau gave four to five grains, every hour, in croup; it opposes the formation of the diphtheritic membrane. Bull. des Sci. Méd. de Férus. xi, 61; Mém. sur le Sénéga, Acad. des Sci. See Mérat, loc. cit. Dr. Milne spoke highly of the decoction, joined with bitartrate of potash, in dropsy. Dr. Percival administered it in hydrops pectoris. If the decoction causes vomiting, some aromatic, angelica, calamus, or fennel, may be added. It is prescribed as a drink in pneumonia, pleurisy, and typhoid fever. Linnæus, in his Veg. Mat. Med. 137, speaks of this plant as a specific in croup (*specificum in phlogose hinc officinis nostris dignissima*). Lind. Nat. Syst. Bot. 87. Stimulant, diuretic, sialagogue, expectorant, purgative, emetic, sudorific, and also emmenagogue. U. S. Disp. 649; Big. Am. Med. Bot. ii, 27; Bart. M. Bot. ii, 111; Mér. and de L. v, 424; Dict. des Sci. Méd. li, 1; Journal de Chim. Méd. ii, 431; Journal Analyt. i, 339. Employed in nervous affections, and hectic fever; in hydrothorax, from its stimulating effect on the kidneys, and in diseases of the lungs, from its augmenting the absorbent forces. Anc. Journal de Méd. lxxvi, 53; Detharding, Diss. de Sénéga, 1749; C. Linn. Diss. upon the Root of the Senega, Argentorati, 1750; Kielhon, Diss. Frankfort, 1765; Helminth, at Edinburgh, 1782; G. Folchi, "Rech. chimico Thérap. sur la racine du polygala du Virginie." In pneumonia, after bleeding, and in the typhoid stage, it is one of our best remedies for promoting expectoration; at an earlier period, it is too stimulating. Much use is made of it on the plantations in South Carolina for this purpose. According to Dr. Bree, it is eminently useful in the asthma of old people, and in the latter stages of croup. It has been employed successfully in chronic rheumatism, and Dr.

Chapman also found it very efficacious in recent cases of amenorrhœa. Frost's Elems. 258; Griffith's Med. Bot. 225; Archer's Med. and Phys. Journal, i, 83; Bree on Asthma, 258; Massie's Inaug. Diss. Phil. 1803; Thacher's Disp. 319; N. Eng. Journal, vii, 206. In croup, it is often given in the form of hive syrup; the best form, however, is a decoction made by boiling one ounce of root in one pint and a half of water, till it is reduced to a pint, the dose of which is a tablespoonful; thirty grains of the powdered root may be given in substance. This plant is employed by the steam practitioners. See Howard's Syst. of Bot. Med. 343.

Polygala sanguinea, L. Nutt. Grows in flat, pine lands; abundantly near Pittsburg; sent to me from Abbeville by Mr. Reed; vicinity of Charleston. Bach. Fl. June.

Lind. Nat. Syst. Bot. 86; Barton's Med. Bot. ii, 17. A stimulating diaphoretic, similar, it is supposed, in properties to the above. Mér. and de L. Dict. de M. Méd. v, 424; Griffith, Med. Bot. 225.

Polygala paucifolia, Willd. Grows in the mountains of South Carolina. Fl. August.

Griffith, Med. Bot. 227 Rafinesque, in his Med. Flora, says it is possessed of active properties; the root having a sweet, pungent, aromatic taste, similar to that of the wintergreen (*Gaultheria procumb.*); he thinks it milder than the *P. senega*, and, therefore, adapted to cases in which that is inapplicable. Griffith does not agree with him, attributing to it merely tonic and bitter properties.

Polygala polygama, Walter. Vicinity of Charleston.
U. S. Disp. 558.

CEDRELACEÆ. (*Mahogany Tribe.*)

Swietenia mahagoni, L. Mahogany. South Florida. Chap. So. Flora.

This tree is cut down in August. See description of method pursued in Honduras, Wilson's Rural Cyc.

The uses of the wood are so well known as to need no farther description.

The bark may, it is said, be used as Peruvian bark. I do not know that the tree is "exploited" in Florida.

LINACEÆ. (*The Flax Tribe.*)

Linum usitatissimum. Flax. Cultivated in South Carolina.

It is cultivated here pretty much on account of the seeds, which are well known for their valuable demulcent properties, and for the linseed oil which they afford. Immediate attention should be paid to raising on a very much larger scale both this plant, the mustard, and the castor oil. Flax matures well in this latitude. For much useful information in reference to the economical application of this plant, see Mér. and de L. Dict. de M. Méd. Sup. 1846, 435.

Among the *thread plants* may be mentioned Flax (*Linum usitatissimum*), Perennial flax (*Linum perenne*), Hemp (*Cannabis sativa*), Virginian silk (*Asclepias syriaca*), Common nettle (*Urtica dioica*), and the Rosebay willow herb (*Epilobium angustifolium*). The three latter are all found growing wild in South Carolina. The asclepias was planted for the purpose in Germany, but is an imperfect substitute for hemp or flax. See *A. syriaca* in this volume. The stem of the hop has also been used for the production of thread. They require farther examination. See Thaër's work, "Principles of Agriculture," p. 461. Hemp seeds also yield oil.

The best drying oils, Chaptal states ("Chemistry applied to Agriculture," p. 145), are those of flax seed, nuts, and poppies. Linseed oil will dissolve at boiling temperature one-quarter of its weight of that oxide known in commerce by the name of litharge. It becomes brown in proportion as the oxide is dissolved; when saturated with the oxide it thickens by cooling, and it is necessary to render it liquid by heat at the time of using it. Linseed oil saturated with the oxide and applied with a brush to any substance, hard-

ens readily and forms a coating impervious by water, and much resembles gum elastic; linen or silk prepared with it is flexible without being adhesive. A cement of this oil, prepared with the oxide and mixed with the refuse or broken fragments of porcelain or well baked potter's ware, is used with great success in uniting the tiles upon roofs, and in cisterns and reservoirs. To form this cement the pulverized fragments are thoroughly incorporated with the heated oil, and applied by the trowel while in that state. When linseed oil is to be used in painting, one-twentieth, or at the most, one-tenth of litharge is sufficient to render it drying.

With linseed oil and common glue, a *water-proof material* is made, which may prove of great use in preparing garments for our soldiers. Immerse common glue in cold water until it becomes perfectly soft, but yet retaining its original form; after which it is to be dissolved in common raw linseed oil, assisted by a gentle heat, until it becomes entirely taken up by the latter; after which it may be applied to substances for adhesion to each other, in the way common glue is usually applied. It dries almost immediately, and water will exert no action upon it. It has more tenacity than common glue, and becomes impervious to water. It may be used also for furniture, and two layers of cloth may be glued together to form a water-proof garment. Glue dissolved in vinegar also makes a very tenacious substance in place of the prepared glues. See plates of machinery for pressing linseed and other oils, Ure's Dictionary of Arts, article "Oils;" also Wilson's Rural Cyc., articles "Flax" and "Linseed." The processes are described with plates. Those interested may find there a full statement of the method of gathering, planting, uses, etc. See also "Olea," in this work. Flax seed intended for planting should not be gathered too quickly. Flax seed was largely made in western New York. The yield is from ten to fifteen bushels per acre. It is sown early in the spring. If raised merely for the seed, it is harvested and thrashed like other grain. But when the stalk is used, it is pulled

up by a machine as soon as the seed begins to ripen, and bound in small bundles, the seed stripped off by a machine, and the stalks spread out and dew rotted; it is then sold to the hemp makers for seven or eight dollars per ton. The farmer sells the crop at one dollar per bushel for the seed, which is sent to the oil-mill.

The reader interested in the preparation and cleaning of the fibres of textile plants, will find a paper upon the subject, condensed from the Singapore Free Press, in the P Office Rep. 1854, p. 174. A description of the simplest and most economical modes of cleaning them is given. The plantain, agave, and aloe are planted in India, and the fibre exported for twine, paper, etc.—bringing from sixty to two hundred dollars per ton. I do not know that these plants are used in our West India islands or in Florida for these purposes. The ordinary mill used in pressing sugar-cane can be used in cleaning the fibre. See article cited.

Wilson's Rural Cyc., article "Bleaching," furnishes a practical explanation of the methods of bleaching flax, hemp, etc. See also Ure's Dictionary.

MALVACEÆ. (*The Mallow Tribe.*)

They abound in mucilage, and are totally destitute of all unwholesome qualities.

Malva rotundifolia, L. Low mallows. Naturalized; grows around buildings; Richland; vicinity of Charleston. Fl. June.

U. S. Disp. 444. A substitute for *M. sylvestris*, which possesses valuable demulcent properties. Woodv. Med. Bot. 554, tom. 197. It is very emollient, and is employed in catarrhal, dysenteric, and nephritic diseases, and wherever a mucilaginous fluid is required. It is administered in the shape of emollient enema, and it forms a good suppurative or relaxing cataplasm in external inflammations. Mér. and de L. Dict. de M. Méd. ii, 207. It was highly regarded by the ancients. "Pythagore regardait leur usage comme propre à favoriser l'exercise de la pensée."

Hippocrates employed it as we do, for gargles and collyriums, as an application to heated and inflamed parts, as a vehicle for pectoral and anodyne medicines, and for those administered in diseases of the urinary passages.

Abutilon Avicennæ, Gærtn., T. and G. } Indian mallows.
Sida abutilon, Linn. and Ell. Sk. } Grows at Granby, in Richland district, and in Georgia; vicinity of Charleston. Bach. Newbern. Fl. July.

Lind. Nat. Syst. Bot. 96; Mér. and de L. Dict. de M. Méd. vi, 338. The plant is said to be cultivated in China as a substitute for hemp. The flowers are employed as an ingredient in emollient applications.

Abutilon and Sida. Species of these two genera have been used in medicine. *S. abutilon* is cultivated in India for the fibre, and somewhat extensively introduced into field culture in Italy. See Rural Cyc., Chap. So. Flora. Our *Abutilons* should be examined; several grow in South Carolina.

Hibiscus Moscheutos, L. Marsh mallow. Collected in St. John's; vicinity of Charleston; Newbern.

Bergius, M. Med. ii, 629. This also is possessed of demulcent properties; a convenient substitute for the above.

Hibiscus esculentus. Okra. Introduced from Africa.

The fruit and pods afford the well-known valuable vegetable, so largely used in the Southern states in combination with tomatoes in making soup. It is very mucilaginous, and, infused in water, forms a suitable vehicle for medicines prescribed in diseases of the mucous passages, for enemata, etc. Some information on this plant may be obtained in the Journal de Pharm. vi, 383. The parched seeds afford a tolerably good substitute for coffee; the difference can with difficulty be detected. It is sometimes used for this purpose among the negroes on the plantations of South Carolina.

This well-known vegetable contains an enormous amount of albumen—so much, that Chaptal says that in St. Domingo it is employed in clarifying liquors. In Guadeloupe and Martinique they use the bark of the slippery elm for this purpose as white of egg elsewhere. It would be a matter of importance to ascertain whether or not vegetable albumen would be useful in clarifying sugar. In employing albumen for clarifying fluids the following method is adopted, according to the writer just mentioned. I would refer the reader also to Ure's Dictionary of Arts and Manufactures. The albumen, generally white of egg, is diluted with water, and then mixed with the liquid which is to be clarified; the whole is then heated to 65° or 70° Fahr., and stirred carefully so as to distribute the albumen equally among all its particles; by increasing the heat the albumen is made to coagulate, when it rises to the top of the vessel, carrying with it all the particles which render the liquid turbid or cloudy; the thick foam which this produces, when cooled, may be taken off with a skimmer, and the liquid be afterward filtrated, to remove any remaining particles from it. The same writer says that animal albumen, mixed with quick-lime, finely powdered and spread upon strips of linen, makes an excellent lute, to be applied over the joints of vessels for distilling, to prevent loss of gas or vapor.

The *Sesamum indicum*, *Bené*, is another plant cultivated on our plantations which has a very large amount of mucilage.

The okra plant has been recommended to be planted for the fibre as a textile substance. Even the cotton plant, if not allowed to come to maturity, and planted closer, like flax and hemp, might furnish an inner bark suitable for twine or cloth. The *Urtica dioica*, nettle, and *Apocynum cannabinum*, Indian hemp, and several species of asclepias, or silk weed, may, by improved cultivation, give a useful fibre; see index. Dr. G. C. Shaeffer, the author of a paper in P O. Rep., 373, 1859, on "Vegetable fibre," states that the fibre of the silk or milk-weed (*A. cornuti*) "was nearly if

not quite as strong as the hemp." In this article, the mode of preparing textile fibres is treated of, and also the best materials for paper making. A curious work, by Dr. J. C. Shaeffer, 1765, is referred to, in which experiments were long since performed upon innumerable substances suited to the making of paper. The latest work of consequence has been published by L. Piette, 1838. Piette gives specimens of good, strong, white paper made from straw. Paper in the United States was also made from wood, sawdust, and shavings, in 1828 and '30. Ure's Dictionary of Arts may also be consulted for machinery, etc. Bark of linden is used in Prussia. See *Tilia*. And the palmetto, agave, and yucca of the South furnish a long fibre. When necessary, the intercellular substance may be dissolved out by strong alkalies—the lye from the ashes of plants, etc. For material for paper making see "Cotton."

The New Orleans Crescent says of coffee:

The supplies of many articles of consumption are running very low. In the meantime substitutes have been proposed, among which is named the okra seed. As regards this, the thought of its becoming a substitute may as well be laid aside at once, for there are not twenty-five sacks of the seed available. The chief substitute will have to be rye. This cereal was used during the war of 1812. In fact, half of the ground coffee which has been sold in New York and Boston for the last twenty-five years was composed chiefly of rye.

Gossypium herbaceum, Linn. Cotton. A native of tropical America. The long staple, including the varieties of sea-island, black seed, and mains, grows best in the lower country; and the short, or green seed, in the upper districts. Prescott states that the Spaniards found it in Mexico. See "Conquest of Mexico."

Mér and de L. Dict. de M. Méd. Supplem. 1846. This was the plant known to the ancients as the Byssus of old writers. Herodotus, t. iii, 134, of Durger's Ed.; Chateaubriand, Journal to Jerusalem, 1777; see Révue Médicale,

Feb. 1845, 225, for Observations on the Employment of the Cotton Fibre in Dressing Wounds; Ann. de Chimie, 427, 1845; Binol's Letters on the Cultivation of Cotton in India; C. Delasterie on the G. herbacea and its Cultivation, Paris, 1808; Lessier sur la Culture du Coton en France; Gerspach, Considérations sur l'influence des filatures du Coton sur la santé des ouvriers, Paris, 1827; Obs. on the Employment of Cotton in the Treatment of Blisters, 1830; Some Reflections by F T. Saint Hilaire on Wounds, and their Treatment with Cotton (in French), Montp. 1830; Sicand, Obs. on the Employment of the Cotton Fibre in Surgery, and a Memoir on the different Species cultivated in Naples, op. cit. sup.; Griffith, Med. Bot. 163; Dr. MacFayden (Fl. Jamaica) considers the species only as varieties. Humboldt saw them growing in Central America at an elevation of nine thousand feet. The flowers are emollient like mallows, and used for similar purposes; the roots are used in India in diseases of the urinary organs. See Ainslie. In Brazil, a decoction of the leaves steeped in vinegar is said to relieve hemicrania. According to Martin, the seeds, which afford much oil, are emollient, and are employed in emulsions, injections, and diseases of mucous passages. The oil is afforded by the seeds in sufficiently large quantities to be exported. It might be made a useful article on the plantations, as it does not deprive the seeds of their valuable properties as a manure. When boiled, they furnish an excellent food for cattle, but are poisonous to hogs when eaten in the raw state. Much use is made of the roots in this state, in the treatment of asthma—a decoction being employed. It appears to have, moreover, a specific action on the uterine organs. Dr. Ready, of Edgefield district, informs me that his attention was called to its emmenagogue properties by an article which appeared in a journal published some years since. (New Orleans Med. Journal.) He has since used it in suppression of the menses, but more particularly in many cases of flooding, with entire success. It seems to produce as active contractions of the uterus as ergot

itself. Three ounces of the root are infused in one pint of boiling water, of which from three to four ounces are taken internally every fifteen minutes. More extended experiments with this remarkable plant, in cases of this description, might furnish very valuable results, and I would invite particular attention to it. See also Pe. Mat. Med. ii, 568; Med. and Surg. Journal, xiii, 215; U. S. Disp. 357; Lond. Med. Gazette, Nov. 8, 1839; West. Journal Med. and Surg. 1840; Royle, Illust. 84, and Mat. Med. 288; Mér. and de L. Dict. de M. Méd. iii, 409; Marcgrave's Brazil, 60; Dict. des Sc. Nat. xxxiv, 15; and Gov. W B. Seabrook's (of S. C.) paper on the cotton plant.

The fibre of our great staple is applicable to many purposes in surgery, in dressing burns, preserving the temperature of the extremities in depressed conditions of the system, and also for stuffing and padding in the application of fracture boxes; but it is not, as has been confidently stated, a substitute for lint in any sense of the term. On account of the oil which it contains, it cannot absorb pus or liquids from wounds, unless it has been previously prepared. This, indeed, is a peculiarity of cotton fibre in its natural state: water or fluids will roll from it; the slightest experience or observation would convince any one of this; and yet it has been extensively distributed as a substance for dressing wounds, which it only tends to render hotter and more inflamed.

The plant has also been highly recommended as a substitute for quinine in intermittent fever. I will refer the reader to some of the later volumes of the Charleston Med. Journal and Review. I have not my volumes at hand to refer to. It has been used with great confidence by many persons throughout the South and West. I introduce the following slip from a newspaper (1862) in default of more precise information from the medical authorities who have used it.

H. D. Brown, of Copiah county, Mississippi, communicates the following notice of the use of cotton seed tea as a *substitute for quinine:*

"I beg to make public the following certain and thoroughly tried cure for ague and fever: One pint of cotton seed, two pints of water boiled down to one of tea, taken warm one hour before the expected attack. Many persons will doubtless laugh at this simple remedy, but I have tried it effectually, and unhesitatingly say it is better than quinine, and could I obtain the latter article gratuitously, I would infinitely prefer the cotton seed tea. It will not only cure invariably, but permanently, and is not at all unpleasant to the taste."

The seeds of the black seed cotton, parched and ground, are considered by many as one of the best substitutes for coffee, both in smell and taste. In a paper by G. C. Shaeffer, on the cotton fibre, Patent Office Report, Agriculture, 1854, p. 181, he says: "Still, in the present scarcity of paper making material, it may be well to look to the bark of the cotton plant as a partial supply for the common kinds of paper. Fermentation, or any of the known methods of separating the wood, may be employed." If the cotton is gathered, the plant has then become too woody. See, also, Okra (*Hibiscus esculentus.*) Governor W B. Seabrook, of S. C., has written perhaps the most full description of the cultivation of cotton, in a pamphlet published a few years since.

Townsend Glover, entomologist, employed by the Patent Office, describes the diseases incident to the cotton plant in his successive papers, in the volumes of the Patent Office Report for 1855–'7, "On the Insects frequenting the Cotton Plant." These papers contain a good deal of information on the character and habits not only of insects infesting cotton, but many other plants, with illustrations on wood. He describes the rust, rot, and blight, and devises methods for preventing their spread. The English use cotton dipped in a solution of saltpetre as a moxa; see "*Helianthus.*" "Gun cotton" is also a well known explosive agent, prepared by means of nitric acid.

Cotton Seed Soap. The following I obtain from the

Charleston Mercury: Put cotton seed into a large and strong iron pot, in small quantities at a time, mash them well with a wooden pestle, and then pour in a certain quantity of common lye, and boil thoroughly; strain in an ordinary sieve, and proceed in the usual way in drying and cutting into cakes. The oil is thus yielded, and saponified.

Machines are now manufactured in this country for decorticating the cotton seed, in manufacturing the cake. It is thus much improved as an article of food for cattle, not being near so liable to injure the animals. It brings a high price in England. Mills for the preparation of the cake have been established in Rhode Island. Strange that nothing of the kind has existed in Charleston, where the seed can be so easily obtained. The great value of the seed as a manure may account in part for the indifference of the planter. The seed has been pressed in New Orleans. The oil is said to be "unsurpassed for dressing leather and lubricating machinery, and as an illuminator affords a clear and brilliant light"—as good as spermaceti, when refined. See also a paper on cotton seed oil, Southern Cultivator, p. iii, vol. 3. He states that there are thirty bushels of seed to every bale of cotton; each bale will yield at least fifteen gallons of crude oil, and three hundred and sixty barrels of oil cake. "No difficulty exists in hulling, tempering, or expressing the oil," and the *huller* of Follet and Smith, of Petersburg, is referred to: hulling at the rate of a basket of kernels in four or five minutes. The machinery employed in French Flanders for rape seed, answers perfectly for cotton seed.

Cotton Seed Oil. A good deal has been said of late in the Cincinnati and New Orleans papers on the subject of cotton seed oil and cake; and if the half of what is published shall turn out to be true, we have reached the beginning of a new era in the cotton culture, not unlike that which marked the invention of the cotton gin. Mr. William R. Free, of Cincinnati, has invented and constructed a cotton seed huller, which entirely separates the hull, and

the little lint that adheres to it, from the meat part of the seed. The huller is said to be simple in construction, is made entirely of iron, and is easily kept in repair. It requires a two-horse power to drive it, and two hands to tend it—one to feed the mill, and one to remove the hulls from the screen. It will hull and screen one ton, or two thousand pounds, per hour, ready for the press—fifty per cent. of which is kernels, or the meats of the seed, from which forty gallons of oil may be obtained. This machine must be exceedingly valuable to prepare seed for all feeding purposes on the farm where no oil is expressed, as the hulls and lint are altogether undesirable as food. Hulls and cotton seed, and cut straw or corn stalks, boiled together in large iron boilers, or steamed in big tubs or vats, will make a superior stock feed. But as a gallon of this oil is cheap at a dollar, and enough seed to make forty gallons can be hulled in an hour, it is far better to feed the cake after most of the oil is taken out, steamed with straw or stalks, than to feed this precious oil to live stock. After cotton seed is hulled, a good cotton press for baling cloth will press out most of the oil in the kernels. Perhaps they may require beating, as in pressing flax seed. The art is very simple. Instead of sending cotton seed to distant markets, where the producer will lose the cake for feeding, and as a fertilizer, we earnestly recommend to each large plantation (or where their operations are small, for several to unite), to purchase a hulling machine, and, if necessary, construct or buy an oil press for home use. According to the data furnished by the Cincinnati operators, four thousand pounds of common cotton seed will turn out fifty dollars worth of oil; and every planter knows that in case he should wish to mix the hulls with the cake in feeding it, or as a manure, he can do so after the oil is expressed. The oil is nearly valueless as a fertilizer, being nothing but carbon and the elements of water, while in skilful hands it is worth some forty to fifty cents a gallon for making fat hogs, sheep, cows, and steers; but more for burning, and lubricating machinery.

At this time we would gladly pay twenty dollars per one thousand pounds for cotton seed cake, to feed cattle, sheep, and hogs. It is worth more than corn or wheat, pound for pound, to feed mules and hogs on a cotton plantation. It contains more of the muscle, sinew, and bone forming matter. It has less starch than corn, but is a healthier food than either peas, beans, wheat, or maize. If the hulls were in the cake, the result would be quite different. In flax seed cake the hull of the seed is not removed. It is owing to the richness of the clean meats of cotton seed that straw, or coarse forage of some kind, should be fed with the cake, except to hogs.

Consequent upon the increased amount of cotton raised in the Southern states, and the great bulk of the seed, there had been several establishments in operation before the war for economizing the oil. At one in New Orleans, driven by a thirty-five horse power steam-press, five hundred gallons of oil and five tons of oil cake a day were prepared. It required for the day's work, as is stated in the Southern Farmer and Planter, about fifteen tons of cotton seed to produce this amount of oil and cake, each ton of seed yielding about forty gallons of oil and seven hundred or eight hundred pounds of cake. The proprietor shipped eight hundred tons to England, where it was used by the farmers, who are extensive importers of linseed oil cake. The cotton seed cake "is highly esteemed for fattening cattle and sheep." In Memphis, Tenn., it was also made in very large quantities. The oil, refined by a secret process, is made of two qualities—"the best used for illuminating and lubricating purposes, as well as for currying leather, etc. The inferior is found to answer the purpose of soap making equal to palm oil, making soap of every quality, even to the most refined toilet soap." Cotton seed cake might be used as a substitute to a certain extent for corn for fattening stock. "Cotton seed meal and corn meal, if applied directly to the hay that is fed in fattening animals, instead of the latter being fed alone and dry, and the corn unground, would add vastly to the profits of fatten-

ing." Cotton seed cake sold at the mills for about the same price that flax seed cake sold for.

Browne, in his "Field Book of Manures," New York, 1853, says of the cotton seeds: "They abound in a mild oil, and are accounted very nutritious (as manures) *after the oil is expressed.* A bushel of seed weighs thirty pounds, and yields two and a half quarts of oil, and twelve and a half pounds of fine meal. The oil cake is very brittle, and breaks down much more readily than linseed oil cake. Its taste is not unpleasant, and it is stated that it can be employed with success in fattening stock."

In the Patent Office Report, 1855, p. 234, are some "Chemical Researches on the Seed of the Cotton Plant," by Prof. C. T. Jackson. In this article a patent is referred to as having been taken out by D. W Mesner for "separating the hulls from the cotton seeds." The yield of the unprepared and woolly seeds is very small, in comparison with what is obtained from those which have been hulled. Analyses are given of the oil, the seed, the cake, etc. Prof. Jackson says: *Separation of the oil:* In order to separate the fixed oil, pure ether was employed, and it was found that one hundred grains of the dried pulverized seeds yielded in one experiment 39.7, and in another 40 per cent. of pure fatty oil. By pressure, I was able with a small screw-press to obtain only thirty-three per cent. of oil; but I have no doubt a more powerful one would have given a larger yield. The specific gravity of the oil which I obtained from the ethereal solution was 0.923—water being unity. This is also the specific gravity of purified whale oil. Cotton seed oil is stated by Dr. Wood to be a drying oil, but that which I have obtained does not appear to possess drying properties, serving perfectly well for the lubrication of machinery, and for burning in lamps, as well as for making soap. It will also serve as a substitute for olive oil in many cases, and perhaps may be eaten as a salad oil, for it has no disagreeable odor or taste.

Chemical examination of the oil cake: Linseed oil cake is well known both in Europe and in this country as valu-

able food for cattle, and as an excellent fertilizer — worth from forty to fifty dollars per ton for the latter purpose. On examining my cotton seed oil cake, I found it possessed a sweet and agreeable flavor, and was much more pure and clean than linseed oil cake. One hundred grains of the seed leave sixty grains of oil cake. This cake, examined for sugar, was found to contain 1.1 grains, and for gum, thirty-five grains were obtained. Iodine gave no proof of the existence of any starch in cotton seed, nor in the oil cake. Alcohol dissolves out the sugar, which is like that obtained from raisins, and is grape sugar. Boiling water dissolves the gum, and becomes very mucilaginous. The gum is precipitable from the water by means of pure alcohol.

Maclura aurantiaca. Osage Orange. N. America. Not included by Chapman in his Flora of Southern United States; position irregular.

From the Patent Office Report, 1848, an article taken from the Prairie Farmer, by Prof. J. B. Turner. The osage orange, the favorite hedge plant of the United States, has already become too well known to need any particular description. It grows in the wilds of North America, in regions further North than New York, and further South than the Carolinas. It is usually in this country from ten to fifteen feet in height, though, like the English thorn, it is said sometimes to attain in its native soil a height of fifty and even sixty feet. Its utility as a hedge plant is no longer an experiment. Hedges of the rarest beauty and excellence have been growing in Boston, Philadelphia, and Cincinnati; in Kentucky, Tennessee, and Northern Missouri; and, in short, in all the Middle and Southern states. Some of these hedges have been standing for ten or twelve years; they were planted by gentlemen of wealth and taste around their favorite walks and grounds at a time when the plants sold at the rate of five dollars per thousand. Among all who have written on the subject, no unfavorable account has come to my knowledge. Great losses have been incur-

red with the seed, as might be expected, but the plant and hedge are universally admired and commended, and it is confidently believed by the best judges that it will double the real value of any farm it surrounds. Recent writers enumerate thus its many advantages: First—its tenacity of life is scarcely equalled; it is a native of the prairies, and will grow on any soil where common prairie grass will grow. Overflowing the land does not harm it. It will live for weeks and months entirely under water. The dead wood is exceedingly hard and durable, and fresh shoots from the stumps soon supply the place of all which have been killed by fire or cutting. Second—its protection is perfect. It is armed with a very sharp, stout thorn under each leaf. Its dense iron branches soon become so interlocked, that no domestic animal, and not even a common bird, can pass through it. Both its thorns and its acrid, bitter juice prevent all animals from browsing or feeding on its branches. Its seed is like the orange, and its roots like the hickory, consequently it can never spread into the field, either from the seed or root, but keeps its own place, growing stronger and thicker year by year. It thus perfectly secures orchards, fruit-yards, stables, sheepfolds, and pasture grounds from all thieves, rogues, dogs, wolves, etc., and one good gate, well locked, makes a whole farm secure from all intruders of whatever description. It may be trained so high as to afford shelter to stock, and break off the rough prairie winds from all grounds needing such protection. Plants may also be prepared so that it can be set in the open prairie without fence with perfect success. See also in Patent Office Report, 1854, p. 419, an article on the best mode of cultivating the osage orange for hedges, and 1855, p. 315, on "Live fences." The insects which feed on it are described, viz: a "chinch-bug," and the mole known as the gopher in Southern Illinois. In Illinois contractors set out and tend the hedge at one dollar a mile, till a good fence is produced. See *Cerasus Caroliniana.* The juice of the osage orange, says Wilson, is exceedingly abundant, and flows freely from incisions, and quickly separates

into a feculant matter, and a supernatant, clear liquid. The wood is uncommonly fine and elastic, and is used by the American Indians for making their bows. It seems well adapted to many purposes of turners. It is said to equal fustic as a yellow dye stuff, and may be much more easily produced. Rural Cyclopædia.

The Cherokee rose forms a most valuable hedge plant. A writer praises highly the "cabbage tree." See also "*Cratægus;*" in this volume.

TILIACEÆ. (*The Linden Tribe.*)

They have all a mucilaginous, wholesome juice.

Tilia Americana, Linn., T. and G. }
" *glabra*, Vent. and Ell. Sk. } Lime tree. Bass wood. An ornamental tree, found in the mountain valleys of South Carolina; Florida to North Carolina; Newbern.

Ell. Bot. 22. The bark, when macerated, forms a strong cordage, used for domestic purposes. The wood is white and soft, and is used by carriage and cabinet-makers.

The inner bark of the European linden (*T. Europea*), forms a strong cordage. Doubtless our American species are also thus distinguished. The plants or branches may be steeped in water for three months, dried, and stripped; for every purpose of cordage on the plantation or garden, this material will be found useful. It forms throughout England the material for "bass," and is used by the horticulturist. The flowers of our American *tilia*, sent to me from Pendleton district, S. C., I find quite as useful as the imported "*Tilleul*," a material for quieting, antispasmodic teas, so much employed in France. It is particularly grateful and soothing to lying-in women: quieting nervous excitement, and pleasant to the taste. I would particularly recommend a larger use of these flowers in the Confederate States. It can be used wherever tea is required. Honey dew is generally most abundant on lime, sycamore, and beech trees; on the cotton plant also. The above remarks apply to *T pubescens* also, which is indigenous.

The wood of the *T. Americana* is white and soft. In the Northern states, where the tulip poplar does not grow, it is used for the panels of carriage bodies and the seats of Windsor chairs. It is, however, apt to split, and is not considered equal to poplar for such and other useful purposes. N. Am. Sylva.

Camelliеæ.

Thea viridis. The introduction of the tea plant into the Confederate States is so important that I will, at any rate, endeavor to give all suitable references to sources of information concerning its culture, preparation, etc. See a pretty full account of the history of its production in the United States in Patent Office Report, 1855, p. 42. The best mode of growing the plant, drying and preparing the leaves, is also described.

For some account of the experiment in the cultivation of foreign tea in South Carolina by Dr. Junius Smith, see P O. Report, 1848, p. 168, and 1859, p. 6. See also vol. for 1857, p. 167, for article on "Practicability of the Tea Culture in the United States." A description is given of the varieties of soil and climate adapted to the growth of tea, its cultivation and preparation, with a notice of the plants set out in Washington. This communication should be read by any one who proposes entering upon the business of raising tea plants; also vol. 1859, p. 5, *et. seq.*, containing successful experiments in Brazil. See *Ceanothus Americanus*, red-root, New Jersey tea tree, as a substitute.

Among our indigenous plants, the Gardenia (*S. pubescens* and *lasianthus*, growing from Florida to North Carolina), belongs to the same natural family, Camelliеæ, as the tea plant, and it should be experimented with. Our Linden tree (*Tilia Americana*), the flowers of which are used in making an antispasmodic tea, is closely related to *Gardenia* and *Thea;* so the botanical relationship and the natural properties are again substantiated. See *Tilia.* It

is said that a pleasant tea can be made likewise from the Holly (*Ilex opaca*).

The introduction of both coffee and tea into Brazil was at first very slow, but was subsequently successful.

A writer in the "Country Gentleman" makes this statement: "A few days ago I drank a cup of real American tea, from the Chinese tea plant, of which Dr. J. P Barrett, near New Market, S. C., has a fine shrub, about four feet high, which has borne fruit during several years. By its side was a thrifty specimen of the *Olea fragrans*, or Chinese olive, with which the tea is scented." I have seen a plant of the *Thea* growing out in the open air, near Stateburgh, South Carolina. In the cultivation of the tea in China, "the lower slopes of the hills are preferred, at 1,000 feet above the level of the sea. In India, from 2,000 to 6,000 feet. The best description of soil for the tea plant is a light loam, well mixed with sand, and enriched with vegetable matter, moderately moist, but neither wet nor sour. Sloping or undulating land of this kind, on which good crops of millet or Indian corn may be produced, is likely to be suitable. Any aspect will do, but east or west is preferred. The tea plant will not flourish in a wet or stagnant soil. * * * When produced from seeds, the tea plant first flowers in the second year. The usual period of flowering is in November, and the seeds ripen the next autumn. The ground is prepared for planting by being dug or trenched in the usual ways. Manure is rarely used in tea culture in China; but where the land is poor, stable-litter and sewage of all kinds are sometimes applied indiscriminately, in moderate quantities, and a top dressing of rich loam is considered valuable. The best time to apply manure is in the spring, before the plants begin to grow, or during mild weather in winter. * * * When the plant is about 18 inches high the leading shoots are pinched off, and the shrub is forced to throw out laterals. Naturally, it has a tendency to grow tall and straggling, with few side shoots. * * * As the leaves used in making tea are produced yearly at the ends of the shoots, the object of

this system of treatment is apparent. * * * A small crop of leaves may be gathered the third year after planting. In the eighth or tenth year, the product may be considered at its maximum. About ten pounds to an acre is produced in China the third year, sometimes three hundred pounds in the tenth year." Art. cit. sup.

MELIACEÆ. (*The Bead Tree Tribe.*)

Bitter, astringent, and tonic properties characterize the species of this order. Some of them are active and dangerous.

Melia Azedarach, Linn. Pride of India. Nat.; diffused; grows in the streets of Charleston. Fl. May.

Chap. Therap. ii, 70; Ell. Bot. 475; Mér. and de L. Dict. de M. Méd. iv, 290; U. S. Disp. 135; Royle, Mat. Med. 308; Bell's Prac. Dict. 87; Eberle, Mat. Med. 207; Frost's Elems. pt. 1; Archives Générales de Méd. xvii, 112; Lind. Nat. Syst. 102; Coxe, Am. Disp. 128. Barton considered it our most active anthelmintic. It is also a febrifuge, adapted to verminous fevers, where no worms are voided. Dict. des Drogues, par Chevallier, iii, 27. Tournon relates a case where a little girl was thrown into convulsions by eating three of the seeds. Mérat also mentions cases. Journal Gén. de Méd. xlviii, 25; Gazette de Santé, Mars, 1824. We have frequently seen them eaten by children in South Carolina, with no bad effect. As an anthelmintic, four ounces of the bark of the fresh root are boiled in one pint of water, till it becomes of the consistence of coffee, of which from one ounce to half an ounce may be given every two hours; it may be drunk sweetened, and should be followed by a cathartic. The dried berries, in spirits, have also been employed against ascarades, tænia, and verminous maladies generally. According to Thacher, the pulp of the berry, stewed in lard, is used advantageously as an ointment in tinea capitis. The decoction of the leaves is regarded as astringent and stomachic, and Dr. Skyston says he uses it with success

in hysteria. This plant is employed in Java and Persia. See Rév. Médicale, iv, 82. The tree is planted around stables, in order that horses, by eating the berries, may be prevented from having "bots." The leaves and berries of the Pride of India, packed with dried fruits, will preserve them from insects. It is much valued in this state as a shade tree, growing equally well in dry pine land residences, and in cities; during the expansion of the flowers, however, it gives out a disagreeable odor. It is easily blown down, and is not long-lived. The wood is beautifully grained, and adapted for table-covers, drawers, etc., never being injured by worms.

A solution or decoction made with the berries of the Pride of India (to a half bushel of the berries put into a barrel add fifteen gallons of water, and let them soak one or two days), and sprinkled with a water-pot over the plants, will, in most cases, prevent the depredation of the black grub or cutworm. The elder (*Sambucus canadensis*) is also said to be excellent, used in the same way. F S. Holmes' So. Farmer. The oil from flax seed (*Linum*) will also destroy all kinds of animals infesting quadrupeds, when rubbed into the skin.

A soap is made from the berries of the Pride of India, which is called "Poor man's soap."

AURANTIACEÆ. (*The Orange Tribe.*)

Citrus aurantium, W Orange. This well known tree is cultivated in Charleston, and grows abundantly in Beaufort district, on the sea-coast; also in Florida, and coast of Georgia. I will refer to the Lemon, also, in this connection.

To obtain the fragrant essences from the fresh rinds of lemons, oranges, etc., the rinds are rubbed against large lumps of loaf sugar until the yellow rind is completely absorbed. Those parts of the sugar which are impregnated with the essence, are, from time to time, to be cut away with a knife, and put into an earthen dish. The whole being thus taken off, the sugared essence is to be closely pressed, and

put by in pots, where it is to be squeezed down hard, have a bladder over the paper by which it is covered, and tied tightly up. It is at any time fit for use, and will keep for many years. Exactly in the same manner may be obtained and preserved, at the proper seasons, from the fresh roots, the essences of the rinds of bitter or sweet oranges, lemons or limes, bergamots, etc., some of which are often unattainable in a fresh state at any price. Thornton's Herbal, p. 659. By this simple means those who have, or can obtain lemons, may preserve the essence for the preparation of cooling, acidulous drinks at any time. Wine may also be made from the orange. Thornton, in his medical work, gives the method as follows: Put twelve pounds of powdered sugar, with the whites of eight or ten eggs, well beaten, into six gallons of spring water, boil them three quarters of an hour; when cold, put into it six spoonfuls of yeast and the juice of twelve lemons, which, being pared, must stand, with two pounds of white sugar, in a tankard, and in the morning skim off the top, and then put it into the water; add the juice and rinds of fifty oranges, but not the white or pithy parts of the rinds; let it work all together two days and two nights; then add two quarts of Rhenish or white wine, and put it into a vessel.

In P O. Rep. 1859, p. 106, is a communication on the products of the Ionian islands and Italy. The following may be useful to those in Florida who raise the lemon in quantity: At *Agrami*, "the most considerable, and sometimes the most valuable portion of the fruit is *Scarito*, or that rejected as unfit for exportation, from which the essential oil contained in the rind, and the juice, or citric acid, in the pulp, are extracted. The essential oil is expressed by the hand, in a room from which the air is carefully excluded, as, owing to its highly volatile nature, the oil produced would be greatly diminished by currents of air. The skin cut from three sides of the lemon is pressed between the thumb and finger, and ten or twelve ounces may be expressed in a long day by an expert workman. The oil thus expressed is put into large receivers, whence

(after remaining some days to deposit the extraneous matter that comes off with the oil) it is transferred to copper bottles for exportation.

"The juice, or citric acid, is obtained by submitting the pulp to a powerful press, which, though rustic in construction, is efficient. This is worked during the season night and day. The quantity of juice produced from one press during twenty-four hours averages 126 gallons. * * Lemon juice intended for exportation is put into well seasoned oak casks, and filled to the bung, so as entirely to exclude the air. When of a good quality, and the filling of the cask is completed, the article may be kept in a cellar or cold place for any reasonable time." Lemon juice, used for calico printing, was afterward boiled down, or evaporated, in leaden pans, over steam, to a certain consistency—the citric acid and mucilage only remaining in a highly concentrated stage. Consult Mulberry (*Morus rubra*, in this volume. See P O. Rep. 1858, p. 257, for Mr. Glover's report on the insects feeding upon it, and a history of the tree in Florida. See also Ure's Dictionary of Arts, article Citric Acid. To prevent attacks of the "scale," an insect, hot water or steam is the best remedy. The Persian powder (see P O. Rep. 1857, p. 129) is also advised (*Pyrethrum caucasicum*)—allied to the ox-eyed daisy (*Chrysanthemum leucanthemum*) growing in the Confederate States.

RHAMNACEÆ. (*The Buckthorn Tribe.*)

Ceanothus Americanus, L. New Jersey tea tree. Redroot. Two varieties exist in this state. Diffused in dry pine barrens; Richland; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Lind. Nat. Syst. Bot. 108; Ferrein, Mat. Med. iii, 338; U. S. Disp. 1240; Ell. Bot. Med. Notes, 291; Mér. and de L. Dict. de M. Méd. ii, 165; Boston Med. and Surg. Journal, 1835. See also the Supplement to Mér. de L. Dict. de M. Méd. 1846, 155. This plant possesses a considerable degree of astringency, and has been used in gonorrhœal

discharges. It is applied by the Cherokee doctors as a wash in cancer, and may be used wherever an astringent is likely to be useful. The Indians employed it in lues venerea, preferring it to lobelia; if the case was violent, the root of the blackberry (*Rubus villosus*) was mixed with it. Stearns' Am. Herbal, 97 Referring to its antisyphilitic powers, Ferrein says: "Elle guerit aussi en moins de quinze jours, les vénériens les plus invéterés." It is not now supposed to be endowed with any very decided virtue in this respect. Dr. Hubbard prescribes it with advantage in the aphthous affections of infants, in malignant dysentery and in other maladies dependent upon debility; he usually combines with it a little borax. See Journal de Pharm. xxiii, 354. Mr. Tuomey, State Geologist, informs me that much use is made of it in domestic practice in Chesterfield district. An infusion of the leaves was employed during the Revolutionary war as a substitute for tea. We have experimented with the leaves, and obtained a liquor somewhat resembling common tea both in color and taste. It imparts to wool a fine, persistent, cinnamon, nankeen color.

The above was included in my report on the Medical Botany of South Carolina, published in 1849. Since the beginning of the war I called the attention of our citizens to this plant as a substitute for foreign tea, in a brief communication to the Charleston Courier (Oct. 1861), having again collected and used it, and induced others to do the same. I quote from this article: "Without any desire to exaggerate, I commend the substitute. It grows abundantly in our high pine ridges. The tea prepared from this shrub, drawn as common tea, is certainly a good substitute for indifferent black tea. Properly dried and prepared, it is better than none. I am glad to report it as a most excellent article to be used in war times in place of a high-priced commodity, which in every respect it closely resembles, if it does not equal." Dr. John Bachman, also, at a later period (1862) directed attention to the plant, stating that he had used it for two months in his own family. The leaves should be carefully dried in the shade.

EUPHORBIACEÆ. (*The Euphorbium Tribe.*)

The general property, according to Jussieu, is an excitant principle, residing principally in the milky secretion, and proportioned in its strength to the abundance of the latter.

Buxus sempervirens. Box. Ex.; cultivated in gardens.

Bergii, Mat. Med. ii, 799; Ed. and Vav. Mat. Méd. 512; Le. i, 244; Griffith's Med. Bqt. 602. The leaves have been affirmed to be violently purgative, and are employed as a substitute for guaiacum. Dém. Élém. de Botanique, iii, 434; Bull. Plantes Vén. de France. A fetid oil is obtained from it, and the wood is prized by engravers for their blocks.

The timber-bearing box tree is planted in England from the seeds to great profit. Besides being ornamental, its timber is very valuable. It attains a great height in Turkey and Asia Minor, and the wood is used by the engraver, and for the manufacture of combs, and musical and mathematical instruments. It will grow on poor lands. The garden box is always dwarfish.

Croton balsamiferum. Willd. South Florida.

This plant, *C. maratimum*, Walt., and several other species, natives of the Confederate States, should be examined on account of their alliance with *C. tiglium*, which produces croton oil. Cascarilla bark, and a dye, are obtained from the genus *Croton.*

Ricinus communis. Castor oil plant. Ex; grows luxuriantly in rich spots. This valuable plant thrives so well in this state, that it might be made a source of profit. On some of the plantations the seeds are boiled, and the supernatant oil given as a cathartic. It might with great advantage be more generally used. See authors passim.

It is believed by some that one variety of the castor oil bean hulls itself spontaneously. I remember no distinc-

tion of this kind mentioned in Pereira's lengthy description of the plant. I have been applied to to ascertain the relative value of the small and large-seeded variety. Pereira states that the oil is equally good and abundant in each. See also the Dictionnaire de Mat. Médicale.

It is being planted extensively by planters for home use in the Confederate States; and at present, 1862, the oil sells at from eight to eleven dollars a gallon. As it is important that this plant should be largely grown, on account of its great value and enormous consumption, I will be at the trouble to insert all the practical information at my disposal.

A brief paper can be found in the Patent Office Report, 1855, p. 27. The writer says that the Palma Christi "has proved itself well adapted to the soil and climate of the Middle and Southern states, and were its culture extended for the manufacture of castor oil, there is no doubt it would be profitable under improved methods of extracting it, and we should no longer be dependent upon other nations for a supply. At present we annually import an amount of this article exceeding in value $30,000."

Although an annual, herbaceous plant in the gardens of the cooler parts of Europe and the United States, within the tropics, and the warm climates adjacent thereto, the Palma Christi becomes a tree of several years standing, often having a woody trunk of the size of a man's body, and fifteen or twenty feet high. This plant thrives best in a light, sandy loam, although it may be cultivated with success in almost any soil tolerably fertile, or in any climate or soil where Indian corn will thrive. In the cooler parts of the Union it may be planted in hills two feet by three apart, two seeds in a place, as early in the spring as the warmth of the ground and the season will admit; but in the South, where the season is longer, and the plant assumes the character of a tree, the hills should be six or seven feet in one direction, and three and a half feet in the other, receiving one seed to a hill, covered to the depth of two inches. The culture is so simple, that it only requires to

keep the plants free from weeds, with a small, flat hill to each. The only difficulty to contend with is, that in saving or harvesting the beans, the outward coats, as they become dry and elastic, fly off the plants to a considerable distance, causing the seeds to drop to the ground. In order to prevent this, it has been recommended to cut off the branches from the plants, as soon as the pods begin to explode, and spread them on the floor of a close room; and after the beans and their shells have parted, to separate the husks from the seeds with a fanning-mill, as with wheat, or try the common riddle and a draught of air. The seeds of this plant furnish the well known medicine, castor oil, which is obtained both by decoction and expression. The former method is performed by freeing the seeds from their husks, which are gathered upon their turning brown, and when beginning to burst open are first bruised in a mortar, afterward tied up in a linen bag, and then thrown into a large pot with a sufficient quantity of water, and boiled until the oil has risen to the surface, when it is carefully skimmed off, strained, and preserved for use. In extensive operations, a mill should be provided, moved by the agency of animal power, water, or steam, for bruising the seeds; and the other apparatus used in obtaining the oil should be of appropriate dimensions. The oil thus obtained, however, has the disadvantage of becoming rancid sooner than that procured by expression. The best mode, therefore, is to subject the seeds to a powerful hydraulic press, in a similar manner to that in which the oil is extracted from almonds and cotton seeds. The seeds yield about one-quarter of their weight in oil.

The reader interested in the varieties, mode of pressure, etc., of castor oil seeds, may consult with profit Mérat and De Len's Dict. de Mat. Méd., Pereira's Mat. Med., the U. S. Disp., and in addition the material included in this paper; also, Ure's Dict. of Arts, article "Oils," and Wilson's Rural Cyc.

The oil may be extracted from the seeds (see U. S. Disp.)

in three ways: by decoction, expression, and by the agency of alcohol.

The process by decoction consists in bruising the seeds, previously deprived of their husks, and then boiling them in water. The oil rising to the surface is skimmed or strained off, and afterward again boiled with a small quantity of water, to dissipate the acrid principle. To increase the product, it is said that the seeds are sometimes toasted. The oil is thus rendered brownish and acrid, and the same result takes place in the second boiling, if care is not taken to suspend the process soon after the water is evaporated. Hence the color of the West India oil, where this method is pursued. "The oil obtained in this country is by *expression.* The following, as we have been informed, are the outlines of the process usually employed by those who prepare it on a large scale. The seeds having been thoroughly cleansed from the dust and fragments of the capsules with which they are mixed, are conveyed into a shallow iron reservoir, where they are submitted to a gentle heat, insufficient to scorch or decompose them, and not greater than can be readily borne by the hand. The object of this step is to render the oil sufficiently liquid for easy expression. The seeds are then introduced into a powerful screw-press. A whitish, oily liquid is thus obtained, which is transferred to clean iron boilers, supplied with a considerable quantity of water. The mixture is boiled for some time, and the impurities being skimmed off as they rise to the surface, a clear oil is at length left upon the top of the water—the mucilage and starch having been dissolved by this liquid, and the albumen coagulated by the heat. The latter ingredient forms a whitish layer between the oil and water. The clear oil is now carefully removed, and the process is completed by boiling it with a minute proportion of water, and continuing the application of heat till aqueous vapor ceases to rise, and till a small portion of the liquid, taken out in a vial, preserves a perfect transparency when it cools. The effect of this last operation is to clarify the oil, and to

render it less irritating, by driving off the acrid, volatile matter. But much care is requisite not to push the heat too far, as the oil then acquires a brownish hue, and an acrid, peppery taste. After the completion of the process, the oil is put into barrels, and is thus sent into market. There is reason, however, to believe that much of the American oil is prepared by merely allowing it to stand for some time after expression, and then drawing off the supernatant liquid. One bushel of good seeds yields five or six quarts, or about twenty-five per cent. of the best oil. If it is not very carefully prepared, it is apt to deposit a sediment upon standing; and the apothecary frequently finds it necessary to filter it through coarse paper before dispensing it. Perhaps this may be owing to the plan just alluded to, of purifying the oil by rest and decantation." A large proportion of oil was obtained through New Orleans from Illinois. The American castor oil, says Wood and Bache, is also prepared by mere expression, rest, and decantation. See *Bené* ("*Sesamum*") for oils and method of expression.

Doctor John Bachman ("J. B."), who has exhibited the character of the true patriot during our present struggles, communicates the following on the *castor oil plant:*

Mode of Culture.—Break up the land with a plough, and lay it off in rows six feet apart, each way. The best time to plant is from the middle of April to the second week in May. Drop three seeds in each hill. Half a bushel of seed will plant ten acres. Treat the plant in the same manner as corn. Be careful in looking after the cutworm, which gives it the preference to corn. When the plants are six inches high, they should be thinned to one stalk in a hill. New lands, broken up the same season, are not suited. One hand can tend five acres. In a good, dry soil, the yield will be from fifteen to twenty bushels per acre, each bushel yielding seven quarts of pure oil.

Gathering the Seed.—About the middle of August the seeds begin to ripen, and will continue until checked by the frost. A writer in the Western Plough Boy, of 1832,

says: "Previous to the ripening of the seeds, the yard for spreading them on should be prepared. It should be made on ground of a gradual descent, open to the sun, and made very smooth and firm. The first and second parcels that ripen must stand till the pods on the ear begin to crack, otherwise a part of the bean will be imperfect. Later in the season, when the stalk is more mature, they must be cut when two or three pods begin to open, or they will waste. They are laid in the yard one ear deep. In warm weather a layer will pop out in three days. When all have opened the stems are raked off. The hulls are swept off with a broom made with naked switches; which, if carefully done, will not leave more than one bushel of hulls in eight of beans. They may be cleaned with a common wheat-fan, with a riddle suited to the size of the bean."

Mode of Extraction.—The oil is obtained both by coction and expression. The former method is performed by tying up the seeds, previously broken and bruised, in a bag, which is suspended in boiling water till the oil is extracted and rises to the surface, when it is skimmed off. This is the usual mode adopted by farmers. The smallest quantity of water, however, remaining in the oil, causes it to become rancid. The "cold expressed oil" is preferable, and will continue pure for a long time. The process is easy and simple. The screw and the lever used in baling cotton will express the oil from the beans. The capsules, or unopened beans, are to be moderately heated in a furnace, not so hot as to be distressing to the naked hand. Under the screw is fixed a strong iron cylinder, into which the beans are put, and covered with an iron follower, of diameter proportioned to the cylinder. The oil is now fit for use. I have seen it stated that "a Southwestern planter began with making 500 gallons of oil in 1825, and in 1831 he produces 13,000." It was then a profitable business at one dollar and fifty cents per gallon.

I trust our planters will see the necessity of preparing to plant the castor oil bean extensively. The great value of the oil as a purgative is the mildness and rapidity with

which it operates. It is much needed by the brave defenders of our soil. It has saved thousands of lives; and if we cannot obtain it, thousands must perish by our inattention to the production of this necessary medicine. That the profits, under moderate prices, are greater than the production of any other article, I am fully aware.

N. B.—Planters should be encouraged to plant largely of the *ground-nut*—it makes an admirable oil; so does the *bené*. Oils are needed not only for table use, but on our machinery of every description.

Mr. W Toney, a writer in the Southern Field and Fire-side, says "there are several varieties, all yielding castor oil, but only one kind which is self-hulling, and this is the true, genuine oil-bean." If this is so, I am not aware of it. I have only seen a large and a small seed variety, and no writer refers, so far as I am aware, to any other distinction. The writer referred to says that, for the *common varieties*, some machinery, like the cotton seed huller, is necessary to decorticate them.

A recent writer says that when the capsule is about to expel the bean it is ripe; the ripe bunches should be removed from the stalk with a knife, and laid thinly over a hard and dry floor of earth, plank, etc., on a hot and sunny day, when the heat of the sun will cause the capsules to expel the contained beans. Now rake away the straw, and winnow away the chaff.

The cleaned beans are now to be beaten in a mortar with a pestle, or ground in a mill to a good degree of fineness. The mass may then be made to give out the contained oil, either by decoction or by expression.

The beaten beans may be used as a purgative, but an overdose is sure to act powerfully as a cathartic, and often as an emetic. Three beans (a little more or less) are generally enough for a dose.

The castor oil bean, after being exposed in the sun, may be thrashed with a flail, or slightly pounded in a mortar, to loosen out the seeds. I would suppose that the best plan would be to winnow out the seeds from their coverings,

To purify the oil of mucilage, which will render it rancid, the oil should be boiled in a little water; the mucilage being insoluble in the water, may be skimmed off. Any water remaining with the oil should be evaporated, taking care not to burn or overheat the oil in the process. Soubeiran considers that all processes in which heat is employed are objectionable, as a quantity of fatty acids is produced, which renders the oil acrid; only, too high a temperature should be avoided. Pereira says that in England the oil is expressed either by Bramah's hydraulic press, or by a common screw-press, in a room artificially heated. It is purified by rest, decantation, and filtration. It is bleached by exposure to light on the tops of houses. In Calcutta it is prepared as follows, Pereira adds: The fruit is shelled by women, the seeds are crushed between rollers, then placed in hempen cloths, and pressed in the ordinary screw or hydraulic press. The oil thus procured is afterward heated with water in a tin boiler until the water boils, by which the mucilage or albumen is separated as a scum. The oil is then strained through flannel, and put into canisters. The small seed variety is supposed to yield the most oil. Beans of ricinus are said by Boussingault to be about four times more rich in oil than either flaxseed, olives, or sunflower seed. He says that 62 pounds of oil can be procured in 100 of the castor oil bean. It is stated that in Jamaica castor oil is often obtained by simply bruising the seeds in a mortar, and boiling them in bags under water—the oil rises to the surface, is skimmed off, strained, and bottled for use. This was the plan used on the plantations in South Carolina during the war of Independence. It would not do for operations on a large scale. See also Encyc. Britannica, art. "Ricinus." The oil is considered good for illuminating purposes. A writer in the Southern Cultivator, p. 29, vol .7, refers to the discovery of a process for separating *stearine* from the pure oil in the seeds, and making the former into candles.

The cake left after the expression of castor oil is very advantageously applied to land as a manure for wheat and

other crops. An interesting communication upon this subject may be found in the first volume of the Farmer's Register, from T. G. Peachy, Esq., of Williamsburg, Va., the results of whose experiments show the great value of the article. In one experiment he applied from fifty to sixty bushels per acre on seven and a half acres of land sown with ten bushels of wheat, and the product was twenty-six bushels of wheat per acre. In this case the land was so poor that not over five bushels could be expected from it without dressing. He recommends about forty bushels as an ordinary dressing. Mr. Peachy does not think the common impression correct, that the chief efficacy of the cake resides in the portion of oil which it retains. His press, he says, "is a very powerful one, and leaves a very small portion of oil in the cake. There is, moreover, other refuse matter in such an establishment as ours, which contains a vast deal more oil than the cake, which I have used as manure, and been uniformly disappointed in its effects. Accident has enabled me, I think, to solve the difficulty, and to declare my belief that the fertilizing qualities of the oil cake reside *chiefly* in the farina it contains. Some time last year, a vessel laden with flour was stranded near Jamestown, and the flour ruined. Mr. John Mann, who owns a farm in the neighborhood, took two or three of the barrels, and top-dressed a small portion of his wheat with it. I was not an eye-witness of its effects; but I was informed that it produced as great an increase of that portion of his crop as my oil cake would have done.

"By experiment, I find that fifty bushels of the cake will weigh 1,800 pounds; and of this quantity I have discovered that ten-eighteenths is farina or flour—equal to five barrels of flour. The cotton seed, I fancy, contains more farina, in proportion to the oil, than the castor bean, and, I believe, would produce as great an effect after being deprived of its oil as it would do in its original state."

Jatropha stimulosa, Mx. Stinging nettle. Grows in dry

pine land; vicinity of Charleston; collected in St. John's; Richland, Dr. L. Gibbes; Newbern. Fl. Aug. The leaves are prickly, and highly irritating when applied to the skin. It might be employed like the nettle (*Urtica*), as a counter-irritant in epilepsies, and diseases requiring stimulating applications.

Acalypha Virginica, L. Grows in dry, fertile lands; vicinity of Charleston; collected in St. John's, Berkley; Newbern. Fl. Sept.

Ell. Bot. Med. Notes, ii, 645. Said by Dr. Atkins, of Coosawhatchie, to be expectorant and diuretic; he has employed it successfully in cases of humid asthma, ascites, and anasarca.

Hippomane mancinella, L. Manchineel. South Florida. Chap.

I find it closely related to *Stillingia* (queen's delight), and it belongs to the *Euphorbiaceæ*. Wilson describes it as a poisonous, evergreen, tropical tree, of the spurge family. It attains a height of eighty feet, and was esteemed a great curiosity in the hot-houses of Britain. The fruit is the size of an apple. A milky, caustic juice abounds in every part of the tree, and if it touches the human eye, is in danger of causing blindness; and if it falls on any part of the human skin, will blister it; if upon linen, it will make it black, and afterward eat a hole through it; yet this forms, adds the author from whom I quote, some of the well known *caoutchouc* of commerce. The timber of the manchineel is very durable, and takes a fine polish, and is much esteemed for various kinds of cabinet-work; but the woodsmen require to dry and consolidate it by surrounding it with artificial fires before felling the trees, else they might be blistered and blinded by its juice. And the cabinet-makers must cover their faces with fine lawn while working it, else they might get their eyes inflamed, and temporarily blinded, with its exhalations and sawdust. The

fruit violently inflames the mouth and throat of any person who tastes it, and it is exceedingly dangerous. Any available part of the plant is so dreadfully active that it cannot, even in the smallest doses, be safely introduced into medicine. A notion prevails among the Americans that the dew which falls beneath the tree is inflammatory and blistering; but this seems to be, the author adds, an absurd exaggeration. The name *Hippomane* signifies horse-madness, ascribing to the tree a maddening effect upon the horse. Rural Cyclopædia. Its resemblance to our *Stillingia*, which is a mere shrub, is close, and the tree wants a careful investigation at the hands of those living in Florida. I have collected the milk from the *Euphorbia* and *Asclepias*, and hardened it, though not in sufficient amount to test its qualities.

Stillingia sylvatica, L. Queen's delight. Collected in the pine barrens of St. John's, Berkley, in great abundance; Richland; vicinity of Charleston; Newbern. Fl. Aug.

U. S. Disp. 687; Frost in So. Journal Med. and Pharm., Oct. 1846; Mér. and de L. Dict. de M. Méd. vi, 535. This plant exudes a milky juice, very pungent to the taste, and flowing in great abundance from the bruised surface. It is used to some extent in this state, as an alterative in scrofula, in syphilis, in cutaneous diseases, in chronic hepatic affections, and in the composition of diet drinks; it adds to the efficacy of sarsaparilla. We are informed by a physician residing in South Carolina, that he has treated syphilis successfully with it. It is believed to be possessed of valuable properties, and greater attention should be paid to it by those living in the country where it is easily obtained. A tincture is made with the root two ounces, of diluted alcohol a pint. Dose a fluid drachm. A decoction is made of the bruised root one ounce, water one and one-quarter pints. Boil to one pint. Dose, one or two fluidounces several times a day; an overdose is cathartic or emetic. The milky juices should be examined. I have inspissated that from the *Asclepias* and *Euphorbia*. See these genera.

Stillingia sebifera, L. Tallow-tree. Nat. from China; collected in St. John's, forty-five miles from the ocean. I have seen it growing abundantly near Charleston, on the King street road.

Mér. and de L. Dict. de M. Méd. ii, 476; see *Croton sebif.* of Mich. An ointment made from this is applied in nocturnal fevers. The Chinese, according to Thunberg, employ the concreted oil extracted from the plant, in manufacturing candles. The Reporters of the Patent Office, for 1848, speak very favorably of it, and recommend its introduction, seeming not to be aware of its being already found here. See their method of extracting the oil.

In my report on the Medical Botany of South Carolina to the American Medical Association, in 1849, I had, as above, reported the fact of this tree being already naturalized. I have recommended it particularly to the soap manufacturers of Charleston and the Confederate States, as a rich material for oil. The seeds, when burned, give out a great deal of light. It could be planted with profit. In the Patent Office Report, 1851, p. 54, there is also a paper on the uses of the *S. sebifera*, with a notice of the Pe-la, or Insect Wax of China. By D. J. Macgowan, M. D., dated Ningpo, August, 1850. In this article, it is stated that the Encyclopædia Americana refers to its being grown along our coast. "Analytical chemistry shows animal tallow to consist of two proximate principles — *stearine* and *elaine*. Now, what renders the fruit of this tree peculiarly interesting, is the fact that both these principles exist in it separately, in nearly a pure state." "Nor is the tree prized merely for the stearine and elaine it yields, though these products constitute its chief value: its leaves are employed as a black dye; its wood, being hard and durable, may be easily used for printing-blocks, and various other articles; and, finally, the refuse of the nut is employed as fuel and manure." Dr. Roxburgh, in his Flora Indica, had condemned the plant as of little value, because, in simply crushing and boiling the seeds, the two principles referred to as existing together are not properly separated. I had my-

self, long since, in my report, published in 1849, and also in my paper in DeBow's Review, August, 1861, recommended this plant to the candle and soap manufacturers for the large amount of oil it contained, and because of its abundance around Charleston. I also gave some of the seeds to a manufacturer of castor oil, to experiment with, in 1851. I will now quote from the paper mentioned, and also refer the reader to a paper on the subject in the Charleston Medical Journal, by H. W Ravenel.

"The *Stillingia sebifera* is chiefly cultivated in the provinces of *Brangsi, Kongnain, and Chekkiang.* In some districts near *Hangchan*, the inhabitants defray all their taxes with its produce. It grows alike on low, alluvial plains, and on granite hills, on the rich mould, at the margin of canals, and on the sandy sea-beach. The sandy estuary of *Hangchan* yields little else. Some of the trees are known to be several hundred years old, and, though prostrated, still send forth branches and bear fruit. Some are made to fall over rivulets, forming convenient bridges. They are seldom planted where anything else can be conveniently cultivated —in detached places, in corners about houses, roads, canals, and fields. Grafting is performed at the close of March, or early in April, when the trees are about three inches in diameter, and also when they attain their growth. The *Fragrant Herbal* recommends for trial the practice of an old gardener, who, instead of grafting, preferred breaking the small branches and twigs, taking care not to tear or wound the bark. In midwinter, when the nuts are ripe, they are cut off, with their twigs, by a sharp, crescentic knife, attached to the extremity of a long pole, which is held in the hand, and pushed upward against the twigs, removing at the same time such as are fruitless. The capsules are gently pounded in a mortar, to loosen the seeds from their shells, from which they are separated by sifting. To facilitate the separation of the white, sebaceous matter enveloping the seeds, they are steamed in tubs having convex open wicker bottoms, placed over caldrons of boiling water. When thoroughly heated, they are reduced to a mash in

the mortar, and thence transferred to bamboo sieves, kept at a uniform temperature over hot ashes. A single operation does not suffice to deprive them of all their tallow; the steaming and sifting are therefore repeated. The article thus procured becomes a solid mass on falling through the sieve, and, to purify it, is melted and formed into cakes for the press. These receive their form in bamboo hoops, a foot in diameter, and three inches deep, which are laid on the ground over a little straw. On being filled with the hot liquid, the buds of the straw are drawn up and spread over the top, and when of sufficient consistence, are placed with their rings in the press. This apparatus, which is of the rudest description, is constructed of two large beams, placed horizontally, so as to form a trough capable of containing about fifty of the rings, with their sebaceous cakes. At one end it is closed, and at the other it is used for receiving wedges, which are successively driven into it by ponderous sledge-hammers, wielded by athletic men. The tallow oozes in a melted state into a receptacle below, where it cools. It is again melted, and poured into tubs smeared with mud, to prevent its adhering. It is now marketable, in masses of about eighty pounds each, hard, brittle, white, opaque, tasteless, and without the odor of animal tallow. Under high pressure it scarcely stains bibulous paper; melts at 104° Fahrenheit. It may be regarded as nearly pure *stearine;* the slight difference is doubtless owing to the admixture of oil expressed from the seeds in the process just described. The seeds yield about eight per cent. of tallow, which sells for about five cents per pound. The process for pressing the oil, which is carried on at the same time, remains to be noticed. It is contained in the kernel of the nut—the sebaceous matter which lies between the shell and the husk having been removed in the manner described. The kernel, and the husk covering it, are ground between two stones, which are heated to prevent clogging from the sebaceous matter still adhering. The mass is then placed in a winnowing machine, precisely like those in use in western

countries. The chaff being separated, exposes the white, oleaginous kernels, which, after being strained, are placed in a mill to be mashed. This machine is formed of a circular stone groove, twelve feet in diameter, three inches deep, and about as many wide, into which a thick, solid stone wheel, eight feet in diameter, tapering at the edge, is made to revolve perpendicularly by an ox harnessed to the outer end of its axle, the inner turning on a pivot in the centre of the machine. Under this perpendicular weight the seeds are reduced to a mealy state, steamed in the tubs, formed into cakes, and pressed by wedges in the manner above described; the process of mashing, steaming, and dressing being repeated with the kernels likewise. The kernels yield about thirty per cent. of oil. It is called *ising-yu*, sells for about three cents a pound, answers well for lamps, though inferior for this purpose to some other vegetable oils in use. It is also employed for various purposes in the arts, and has a place in the Chinese pharmacopœia because of its quality of changing gray hair black, and other imaginary virtues. The husk which envelops the kernel, and the shell which encloses them and their sebaceous covering, are used to feed the furnaces—scarcely any other fuel being needed for this purpose. The residuary tallow cakes are also employed for fuel, as a small quantity of it remains ignited a whole day. It is in great demand for chafing-dishes during the cold season, and, finally, the cakes which remain after the oil has been pressed out are much valued as a manure, particularly for tobacco fields, the soil of which is rapidly impoverished by the Virginia weed. Artificial illumination in China is generally procured by vegetable oils; but candles are also employed by those who can afford it, and for lanterns. In religious ceremonies no other material is used. As no one ventures out after dark without a lantern, and as the gods cannot be acceptably worshipped without candles, the quantity consumed is very great. With an unimportant exception, the candles are made of what I beg to designate as vegetable *stearine*. When the candles, which are made by

dipping, are of the required diameter, they receive a final dip into a mixture of the same material and insect wax, by which their consistency is preserved in the hottest weather. They are generally colored red, which is done by throwing a minute quantity of alkanet root (*Anchusa tinctoria*), brought from Shangtung, into the mixture. Verdigris is sometimes employed to dye them green. The wicks are made of rush coiled round a stem of coarse grass, the lower part of which is slit to receive the *pin* of the candlestick, which is more economical than if put into a socket. Tested in the mode recommended by Count Rumford, these candles compare favorably with those made from spermaceti, but not when the clumsy wick of the Chinese is employed. Stearine candles cost about eight cents per pound.

Euphorbia corollata, L. Wild hippo; wild ipecac. Collected in St. John's, Berkley; Charleston district; in dry soils; vicinity of Charleston; Newbern. Fl. Aug.

Frost's Elems. Mat. Med. 82; Bell's Pract. Dict. 199; Am. Journal Med. Sci. xi, 22; U. S. Disp. 321; Big. Am. Med. Bot. iii, 119; Royle, Mat. Med. 542; Mér. and de L. Dict. de M. Méd. iii, 179; Clayton's Phil. Trans. Abridg. 331; Zollickoffer, Mat. Med. 1819; cit. in Bart. loc. sup.; Coxe, Am. Disp. 272; Griffith, Med. Bot. 593. It is emetic, diaphoretic, and cathartic. Dr. Zollickoffer thinks that, as a diaphoretic, combined with Dover's powder, it is not inferior to ipecacuanha. He tried it in seven cases. Twenty grains of the powdered root would produce emesis, sometimes followed by hypercatharsis. Dr. McKeen states that twelve grains of the root in substance have double the purgative power of an equal quantity of jalap. "Combined with opium and the sulphate of potassa, an excellent diaphoretic in dropsy." See Dict. de Mat. Méd. Dr. Frost, Prof. Mat. Med. South Carolina Med. Coll., thinks it quite as active as the ipecacuanha, and fully entitled to the consideration of the profession, he having used it with benefit in his own practice. "Even should they not be employed, every physician should be instructed in their properties,

and, when occasion requires, know the substitute he can apply to in case of need." Op. cit. 82. A drachm to eighty or one hundred grains may be added to a half pint of hot water, which may be given in tablespoonful doses every five or ten minutes till vomiting is induced. This is a convenient mode of administration. According to experiment, the contused root will excite vesication and inflammation if applied to the skin. Maj. John Leconte, of New York, informs me that he has been much pleased with its effects as a sudorific. Dose as an emetic, twenty grains; as a cathartic, ten grains; as a diaphoretic, four grains. This plant is easily obtained, and can be conveniently prescribed. It should be used with caution in cases of insensibility of the stomach.

Euphorbia ipecacuanha. Carolina hippo. Grows in Abbeville, Edgefield, and Colleton districts; Newbern. Fl. June.

U. S. Disp. 223; Barton's Med. Bot. 120. An energetic and tolerably certain emetic; but liable sometimes to produce excessive nausea by accumulation; hence, thought by some writers "wholly unfit to supersede the officinal ipecacuanha." This opinion, however, has been questioned by Hewson, Royal, and others. Barton said it was equal, and in some respects superior. Lind. Nat. Syst. Bot. 114; Shec. Flora Carol. 555; Mér. and de L. Dict. de M. Méd. iii, 182; Coxe, Am. Disp. 272; Schoepf, Mat. Med. 74; B. S. Barton, Collec. 26; W P Barton, Veg. Mat. Med.; Griffith's Med. Bot. 592; Frost's Elems. 81. It sometimes has its action extended to the bowels, and operates with a considerable degree of activity. Dose as an emetic, fifteen to twenty grains; as a diaphoretic, five grains. Bigelow notices among its constituents caoutchouc, resin, mucus, and fæcula. Am. Med. Bot. ii, 109. It is evident, from the variety of opinions expressed in relation to this plant, that it should be given with caution. Both species are considered to be more active than the imported ipecacuanha.

Euphorbia hypericifolia, L. Spurge; eye-bright. Grows in the upper district, according to Elliott; vicinity of Charleston, Bach; Collected in St. John's; found by Dr. Boykin, in Georgia. Fl. July.

U. S. Disp. 321. Highly recommended by Dr. Zollickoffer, of Baltimore, in dysentery, after due depletion. In diarrhœa, menorrhagia, and leucorrhœa, a half ounce of the dried leaves is infused in a pint of boiling water, of which a fluid half ounce must be taken every hour in dysentery, and the same quantity after every evacuation in diarrhœa, and two ounces morning, noon, and night, in amenorrhœa, fluor albus, etc. See, also, Mér. and de L. Supplém. to the Dict. de M. Méd. 1845, 282, where Dr. Zollickoffer's success in twelve cases is referred to; also, Am. Journal of Med. Sci. Nov. 1832; M. and de L. iii, 181. It possesses some narcotic power, also, which contributes to render it peculiarly applicable in these diseases. Journal Méd. de la Gironde, 161, 1825. Martius says it has the same properties as the *E. linearis* the milky juice of which is used in Brazil in syphilitic ulcers. He had often tested its value in ulcers of the cornea. Journal de Chim. v, 427. The juice applied to the eye causes severe smarting, and it is thought to cause the severe salivation to which grazing horses are subject. From several of the spurge tribe a gum (euphorbium) is obtained by incision, which concretes by exposure to the air. It is a dangerous irritant, and has to be handled with caution. Mixed with starch to weaken it, it may be used externally. Our Euphorbias should be examined for caoutchouc, and the juice investigated carefully and cautiously; so, also, the juice of the *Stillingia.*

Euphorbia maculata, L. Cultivated soils; vicinity of Charleston; collected in St. John's. Fl. July.

Mér. and de L. Dict. de M. Méd. iii, 184; Ainslie, Mat. Med. Ind. ii, 76. Juice employed with great success in cleansing the cornea of the spots and pellicles (les pellicules) following small pox. Mérat says the ancients recommended these plants in diseases of the eye. Dr. Zol-

lickoffer speaks of this species, also, as possessing valuable properties. All are endowed with some emetic power.

Euphorbia helioscopia. Grows near the Horseshoe bridge, Ashepoo, and on Hutchinson's island. See Ell. Sketches. Fl. May.

Dém. Élém. de Botanique, ii, 21. "A valuable purgative." According to Mér. and de L. Dict. de M. Méd. iii, 181, it is useful in spyhilis when mercury is contraindicated. Dr. Nonne assures the profession of its utility. See Bull. des Sci. de Fér. ii, 354.

Euphorbia thymifolia, L. Included by Thomas Walter, in his Flora Carolina, among the South Carolina species. Mich. says it grows on the Mississippi. Mér. and de L. Dict. de M. Méd. iii, 188. In India, the powder is administered in the verminous disorders of infants. Ainslie, Mat. Med. Ind. 275.

Mercurialis annua. Grows around Charleston. Introduced.

A poisonous, narcotic plant, with emetic properties, but less active than the *M. perennis.* Seeds purgative. It partakes, to a certain extent, of the acrid qualities of the Euphorbiaceæ.

Celastraceæ.

De Cand. says an acrid principle has been detected among the species.

Euonymus Americanus. Rare; grows in swamps; collected in St. John's, Berkley. Fl. May.

Griffith's Med. Bot. 220. Emetic, discutient, and antisyphilitic. It is also thought to be narcotic. The seeds are said to be nauseous, purgative, and emetic, and are used in some places to destroy vermin in the hair. Leaves are poisonous to cattle.

Euonymus atropurpureus. Possesses properties similar to the above.

STAPHYLEACEÆ. (*Bladder-nut Family.*)

Staphylea trifolia, L. Three leaved bladder-nut. Damp woods North Carolina, Tennessee, and northward (Chap).

The nut of our tree resembles closely that of the *S. pinnata*, which is used in Catholic countries for making rosaries. Rosaries are also made of the seeds of the Pride of India tree (*Melia*). The nuts of the *S. trifoliata* resemble a large, inflated bladder.

Cyrilla racemiflora, Walter. Grows in swamps, and inundated lands; collected in St. John's, where it is found in abundance; vicinity of Charleston; Newbern. Fl. July.

Ell. Bot. Med. Notes, i, 295. The outer bark of the oldest shrubs, near the root, is extremely light and friable, and absorbs moisture. It has been used with advantage as a substitute for agaric and other styptics. I learn that it is much confided in for this purpose by those living in Darlington district, South Carolina. When rubbed on the hand, it produces a sensation similar to that produced by the application of an astringent fluid. It has also been applied to ulcers when the indication is to cicatrize them. This plant merits further attention.

Cliftonia ligustrina, Banks. (*Mylocarium*, Willd.) Titi. Pine-barren ponds and swamps, Florida, and lower districts of South Carolina and Georgia.

Mr. Johnson, of Beaufort, S. C., informs me that the stems, when dried, are found to suit admirably for pipe-stems—a heated wire being passed through the pith.

CLUSIACEÆ. (*Balsam Tree Family.*)

Clusia flava, L. South Florida.

Wilson, in his Rural Cyclopædia, says that the balsam tree, *Clusia rosea*, grows in Carolina and West India islands. "A balsam resembling turpentine exudes from every part of the tree, and has been much used as a plaster for the cure of sciatica. The West Indians call this balsam hog

gum, from a belief that wild hogs rub themselves against it to obtain a cure of their wounds."

Canella alba. Swartz. South Florida. Chap. This is an aromatic tree, bearing black berries.

PORTULACACEÆ. (*The Purslane Tribe.*)

Portulaca oleracea, Walter. Garden purslane. Grows in yards and rich soils; vicinity of Charleston; collected in St. John's; Newbern. Fl. Aug.

Linn. Veg. M. Med. 88; Mér. and de L. Dict. de M. Méd. v, 458. It is antiscorbutic, diuretic, and anthelmintic, and vaunted as an antidote for poisoning from cantharides. According to Linnæus, the herb was used in strangury. It will coagulate milk. The American dispensatories do not vouchsafe it the same notice that it has received in various parts of Europe. It has long been used as a salad and potherb. The young shoots are gathered when from two to five inches long. Rural Cyclopædia. A blue color is obtained from this plant. The following is given by an agricultural journal: Boil a bushel of garden parsley or purslane till soft in an iron pot or kettle, and strain off the liquor; boil a pound of logwood, also in iron, for two hours, strain off the liquor, and mix the purslane water; then dissolve half a pound of alum in soft water, sufficient to cover three pounds of yarn; put it in a brass or copper kettle, and simmer the yarn in it for three hours; then wring and put into the dye; simmer this three hours, with frequent stirring. The depth of the color may be varied by varying the quantity of the logwood. A very desirable blue dye is obtained. See Ohio and Southern Cultivator.

SILENECEÆ. (*The Dianthus Tribe.*)

Uniformly insipid.

Silene Virginica, L. Grows on the margin of roads; vicinity of Charleston; collected in St. John's. Fl. June.

Griffith, Med. Bot. 188; Barton's Collec. i. 39; U. S. Disp. 1296; Mér. and de L. Dict. de M. Méd. vi, 342; De Cand. Essai, 94; Lind. Nat. Syst. Bot. 125. The decoction of the root acts as an anthelmintic.

Saponaria officinalis, Linn. Soapwort. Nat. in upper districts; Newbern. Fl. Aug.

U. S. Disp. 1293. This plant imparts to water the property of forming a lather, from a principle it contains called saponine, which is allied to the active constituent of sarsaparilla, and as a substitute for which it is frequently used. This is obtained by treating the watery extract with alcohol, and evaporating. It has been used in Germany in visceral and scrofulous affections, cutaneous eruptions, and by some is thought superior to sarsaparilla in efficacy. The decoction or the extract may be given. Audry said the inspissated juice would generally cure gonorrhœa in two weeks, without any other remedy. *Op. cit.* Wade's Pl. Rariores, 32; Mér. and de L. Dict. de M. Med. vii, 220; Flore Med. vi, 311. It is regarded as diuretic, aperient, and sudorific, recommended in engorgement of the abdominal viscera, stomach, intestines, lymphatic glands, and in icterus, cachexy, etc. On account of its sudorific properties, it is advised in syphilis, rheumatism, and gout. Perrihle gave it combined with mercury; while fresh, administering it in doses of one-half ounce of the decoction, or from twenty-four to forty-eight grains of the extract. Journal de Chim Méd. vi, 747, and vii, 710; Ludolff, Diss. de Rad. Sap. Offic. Erfordiæ, 1756; J. F Cartheusen, Diss. de Sap. Frankfort; Amielhon, "Si le Struthium des anciens est véritablement la saponaire des modernes." Mém. Nat. des Sci. et des. Arts, i. 587.

A decoction of this plant has been used in some countries as a substitute for soap, and is well capable of cleansing woollen fabrics; the leaves were considered laxative. Wilson's Rural Cyc. Consult "*Sapindus*" and "*Æsculus*," in this paper, for other plants used as substitutes for soap. The *Sapindus* (soapwort) also furnishes one species, *S.*

marginatus, which may be useful. Found in Florida and Georgia, near the coast.

Salsola soda. Barilla plant. I would particularly advise the planting in the Confederate States of this plant (cultivated so largely in Spain, Sicily, and Sardinia), on account of its great value in the ready manufacture of crude soda—which is now supplanting, on account of its cheapness, the use of potash in the manufacture of soap. Beside, soda gives a *hard* soap. According to the analysis of Ure, "good barilla contains twenty per cent. of real alkali, associated with muriates and sulphates of lime, soda," etc. Caustic lyes made from it are used in the finishing process of hard soap manufacture.

The *Salsola kali*, L. Saltwort. *S. Caroliniana* of Walt. It grows in Georgia, and northward; and I have little doubt is rich in soda, and may be made of great use to us in the production of this most important product.

The barillas, Ure says, "always contain a small proportion of potash, to which their peculiar value, in making a less brittle or more plastic hard soap than the fictitious sodas, may, with great probability, be ascribed."

I will give the method of preparing soda from the *Salsola*: "Of manufactured soda, the variety most anciently known is barilla, the incinerated ash of the *Salsola soda*. This plant is cultivated with great care by the Spaniards, especially in the vicinity of Alicant. The seed is sown in light, low soils, which are embanked toward the sea-shore, and furnished with sluices for admitting an occasional overflow of salt water. When the plants are ripe, the crop is cut down and dried; the seeds are rubbed out, and preserved; the rest of the plant is burned in rude furnaces, at a temperature just sufficient to cause the ashes to enter into a state of semifusion, so as to concrete on cooling into cellular masses, moderately compact," etc. "Another mode of manufacturing crude soda is by burning sea-weed into kelp." Ure. Now, crude soda, and the

soda ash of commerce, are made altogether by the decomposition of sea salt. I am not aware whether our native *Salsola kali* grows in abundance upon the coast of the Carolinas and Georgia. See "Corn" (*Zea mays*) for economical mode of making soda from corn-cobs.

Directions for making "Home-made" Soda.—The Richmond Dispatch publishes the following: "The preparation more closely resembles saleratus than soda, and is a comparatively pure article for making bread. It is more valuable in view of the scarcity and high price of soda in our drug stores. After making a strong lye from ashes, boiling down to dryness, and burning till white, take the residue and add its own weight of cold water, set in a cool place for several days, say a week, stirring frequently; then strain through a fine cloth, and boil down again to dryness, stirring frequently, and, finally, cork up the powder so obtained in a bottle. These operations should all be conducted in an iron vessel, not in glass or stoneware."

I insert the following from a journal of the day, hoping that they may prove useful:

Soap Receipts.—In these times of war and blockade, when our people are thrown almost entirely upon their own resources, every item looking to domestic economy and home production should be carefully observed. Our people are passing through a trying ordeal, but they are learning lessons which will be of practical utility in after times. Habits of economy, and elements of self-reliance, which have been pushed aside by the pressure of an extravagant sentiment, by an increasing love for easy and luxurious living, and by the versatility of Yankee genius in supplying our almost every want, are now, from the influences of necessity, being resumed, while they are found to embody all of practical utility which they possessed in days of yore.

Looking to the general principle of domestic economy and home effort, we annex the following receipts for making soap, which we find in the Wilmington Journal. One

of these receipts has been patented at the North. If tried, they will no doubt be found valuable at this time:

To Make Family Soap.—Take six quarts of soft water, six pounds of bar soap, one-quarter of a pound of sal-soda, three teaspoonfuls spirits turpentine, one and a half teaspoonful hartshorn, one teaspoonsful of camphor, two teaspoonfuls of salt. Cut the soap up fine, boil the water, and add all the ingredients, and boil thirty minutes; take off, and pour into shallow vessels to cool and harden.

Another.—Five pounds bar soap, four pounds sal-soda, two ounces borax, and one ounce hartshorn. Dissolve in twenty-two quarts of soft water, and boil fifteen or twenty minutes.

To Make Jelly Soap.—After pouring out of the vessel the above soaps, pour in water enough to wash off the sides and bottom, and boil twenty minutes. Then pour off to cool, and you have excellent jelly soap for washing clothes, etc.

To Make Soft Soap.—Take ten pounds potash well pulverized, fifteen pounds grease, and three buckets boiling water. Mix, and stir potash and water together until dissolved. Then add the grease, stirring well; put all into a barrel, and every morning add two buckets cold water, stirring it well each time, until the barrel is nearly full, or mixed to the consistency of soft soap.

Consult hickory, *Carya*, for manufacture of potash and potash soap from ashes.

Spergula arvensis. Walt; Linn. Spurrey. Grows in cultivated lands, lower country of South Carolina: vicinity of Charleston; collected in St. John's.

Mér. and de L. Dict. de M. Méd. vi, 497: "Cows which feed on it give milk of a richer quality, and in larger quantities." The seeds of a variety of this plant growing in Germany continue green during fall and winter, are far superior to pasture grasses, and yield an oil suitable for lamps upon expression. They are also ground up with rye, and used for making bread. Poultry eat spurrey in any

form, and are thought to become very prolific of eggs when fed upon it. Rural Cyclopædia, and Thaër's Agricultural Chemistry.

Stellaria media. Smith. Chickweed; stitchwort. Introduced. Yards and gardens.

The herbage is greedily devoured by hogs, and is said to be nutritive, and suitable for being boiled and eaten in the manner of spinach. It has the reputation, when boiled in vinegar and salt, of possessing virtue to cleanse eruptions of the hands and limbs. The flowers serve in some degree as a natural barometer; for when rain is approaching they remain closed, and in dry weather they are regularly open from about nine o'clock in the morning till noon. Wilson's Rural Cyclopædia.

XANTHOXYLACEÆ.

The species belonging to this order are generally aromatic and pungent.

Xanthoxylum.
Americanum, T. & Gray
fraxineum, Willd.
ramiflorum, Mich.
Clara Herculis, Linn.
Prickly ash; toothache bush.

Barham's Hortus Americanus. The scraped root is applied to ulcers in order to heal them. The plant possesses stimulating powers, and is a "powerful sudorific and diaphoretic;" remarkable, according to Barton, for its extraordinary property of exciting salivation, whether applied immediately to the gums, or taken internally. It is reported to have been used successfully in paralysis of the muscles of the mouth, and in rheumatic affections. Mér. and de L. Dict. de M. Méd. vi, 179; Journal Gén. de Méd. xl, 226. Dr. Gillespie asserts that it is a good tonic and febrifuge. According to Cam, the Indians employed the decoction as an injection in gonorrhœa: "Voyage to Canada." It has been given in syphilis as a substitute for

guaiacum, and also for mezereon. See Anc. Journal de Méd. ii, 314. A peculiar principle, xanthopierite, is afforded by it. See also *X. fraxineum*, with which this plant is frequently confounded, as well as with the *Aralia spinosa*. U. S. Disp. Its acrimony is imparted to boiling water, and to alcohol. According to Dr. Staples, besides fibrous substances, it contains volatile oil, a greenish, fixed oil, resin, gum, coloring matter, and a peculiar crystallizable principle, which he calls xanthoxylin. Journal Phil. Coll. Pharm. i, 165. It is stimulating: producing, when swallowed, a sense of heat in the stomach, arterial excitement, and a tendency to diaphoresis. It enjoys considerable reputation in chronic rheumatism. Dose of powder from ten grains to half a drachm. It has been tried by many with advantage in this disease. Barton's Collec. i, 25, 52; Thacher's Disp. sub. *A. spinosa;* Big. Am. Med. Bot. iii, 162. In rheumatism an infusion is given, made of one ounce of the bark to one quart of boiling water; one pint to be administered in divided doses during the twenty-four hours. Rep. from Surgeon-Gen. Office, 1862.

X. Carolinianum, Lam. and T. and G. }
tricarpum, Ell. Sk. } This species is supposed to be possessed of similar properties with the above. It is the prickly ash of the Southern states. T. and G.

Chapman, in his Flora of Southern states, does not include *X. Americanum* (toothache bush, Hercules' club) among our Southern plants.

These plants have the reputation in America of being powerfully sudorific and diaphoretic, and excite copious salivation, not only when made to act directly on the mouth, but when taken internally, and have been found highly efficacious in paralysis of the muscles of the mouth. Rural Cyc. This may account for their utility in toothache.

SIMARUBACEÆ. (*Quassia Family.*)

Simaruba Glauca. D. C. Quassia. South Florida. A large tree. Chap.

This species of quassia, though not the officinal, should be examined for any bitter tonic properties it may contain.

GERANIACEÆ. (*The Geranium Tribe.*)

Characterized by an astringent principle, and an aromatic or resinous flavor.

Geranium maculatum, Linn. Cranesbill; crowfoot; alum root.

Lind. Nat. Syst. Bot. 137; Coxe, Am. Disp. 304; Eberle, Mat. Med. i, 382; Bell's Pract. Dict. 218; Big. Am. Med. Bot. 189; Thacher's Am. Disp. 224; U. S. Disp. 350; Royle, Mat. Med. 73; Bart. M. Bot. i, 140; Pe Mat. Med. and Therap. ii, 751; Am. Journal Pharm. iv, 190; Journal Phil. Coll. Pharm. i, 171; Ed. and Vav. Mat. Méd. 135; Schœpf, Mat. Med. 107; Barton's Collec. 7; Cutler, Mem. Am. Acad. i, 469; Mér. and de L. Dict. de Mat. Méd. iii, 369; Journal Pharm. xiii, 287 It is a powerful astringent, adapted to passive hemorrhages, chronic diarrhœa, and cholera infantum. It is injected with advantage in cases of gleet and leucorrhœa, and is used as a wash for old ulcers. Bigelow speaks of it as a very powerful astringent, very similar to kino and catechu, and a useful substitute for the more expensive articles. It forms an excellent local application in sore throats and ulcerations of the mouth, and is adapted to the treatment of such discharges as continue from debility after the removal of their exciting causes. Colden and Schœpf also speak highly of the root in dysentery; and Dr. B. S. Barton, in cholera infantum, used the decoction in milk. Eberle was successful with it, in his treatment of aphthous affections of the mouth, and of ulcerations of the fauces and tonsils. Griffith, Med. Bot. 209. By Staples examination, Journal Phil. Coll. Pharm. i, 171, it contains tannin, gallic acid, mucilage, a small proportion of amadin, and red coloring matter; from the bark, a small quantity of resin and a peculiar crystallizable principle.

Dose of the powdered root in substance, is twenty to

thirty grains, one to two ounces of the tincture, and ten to fifteen grains of the extract. The decoction is made by boiling one ounce of the root in one pint of water, the dose of which is one to two tablespoonfuls. The extract is said to be the best form; alcohol and proof spirits, however, readily dissolve the active principle, and the tincture keeps best.

BALSAMINACEÆ. (*The Balsam Tribe.*)

According to De Cand., the species are diuretic. They are chiefly remarkable for the elastic force with which the valves of the fruit separate at maturity, expelling the seeds. Lind.

Impatiens { *pallida*, Nutt.; T. and G. / *noli me tangere*, Ell. Sk. } Touch-me-not; jewel-weed. Grows in inundated swamps; vicinity of Charleston; collected in St. Johns. Fl. July.

Bull Plantes Vén. de France, 166: "The whole plant is very acrid, and is used as a cataplasm." Élém de Bot. iii, 58. Six grains of the dried leaves will produce nausea. The U. S. Disp., 1264, speaks of it as a dangerous plant, possessed of acrid properties; when taken internally, acting as an emetic, cathartic, and diuretic.

OXALIDACEÆ.

Leaves generally acid.

Oxalis acetosella, L. White wood-sorrel. Mountains of North Carolina, and northward. Chap.

The plant is a very agreeable and wholesome salad, and possesses refrigerant, antiscorbutic, and antiseptic properties. The juice coagulates milk, and precipitates lime from solution. When boiled in milk, it gives off its acidulousness to the whey; and either this whey, or the expressed juice of the plant, much diluted with water, may be used as a good refrigerant drink in fevers. Rural Cyc. The herb is powerfully and most agreeably acid, making a re-

freshing and wholesome conserve with fine sugar; its flavor resembles green tea.

Oxalis violacea, L. Wood-sorrel. Grows in rich soils; vicinity of Charleston; collected in St. John's. Fl. May. U. S. Disp. 66. It contains the oxalate of potash, which imparts to it its pleasant, acid taste.

Oxalis corniculata, L. } Vicinity of Charleston; similar
" *furcata* Ell. Sk. } in properties to the *Ox. violacea.*

Rosaceæ. (*The Rose Tribe.*)

None of the species are unwholesome; they are generally characterized by the possession of an astringent principle. The sub-order, *Amygdaleæ*, are better known for yielding Prussic or hydrocanic acid.

Potentilla (*canadensis?*). Grows in meadows, in lower and upper districts; St. John's, South Carolina.

Dr. Richard Moore, of Sumter district, South Carolina, informs me that this plant, on account of its bitter, mucilaginous qualities, has been found, by repeated experiment, to be a most efficient and useful remedy in the treatment of chronic colds, threatening phthisis. The decoction is used. He refers to the plant as the *P. reptans* (*?*).

Rubus villosus, Ait. High bush blackberry. Diffused; observed in Fairfield district; collected in St. John's; vicinity of Charleston; Newbern. Fl. May.

Eberle, Mat. Med. i, 386; Pe. Mat. Med. ii, 453; Ed. and Vav. Mat. Méd. 134; Royle, Mat. Med. 374; U. S. Disp. 603–4; Ball. and Gar. Mat. Med. 267; Big. Am. Med. Bot. ii, 160; Chap. Therap. and Mat. Med. ii, 474; Thacher's U. S. Disp. 341; Lind. Nat. Syst. 144; Barton's Collec. ii, 157; Griffith, Med. Bot. 270. Bigelow considers it a powerful astringent, and is satisfied of its efficacy, administered both internally and externally, in a variety of cases admitting of relief from this class of remedies. Dr. Chapman

also speaks highly of it in the declining stage of dysentery, after the symptoms of active inflammation are removed; he asserts that nothing in his hands had done so much to check the inordinate discharges in cholera infantum — two or three doses sufficing to bind up the bowels. The decoction is made of one ounce of the root in a pint and a half of water, boiled down to one pint, of which the dose for a child is two or three teaspoonfuls; for an adult, a wine-glassful several times a day; orange peel may be added. Dose of the powdered root, twenty or thirty grains. No analysis has yet been made. In the old work on "Herbs," by Nicholas Culpepper, gentleman, "Student in Physic and Astrology," the author observes of one of the genus *Rubus:* "Either the decoction or powder of the root being taken, is good to break or drive forth gravel, and the stone in the reins and kidneys." "The berries, and the flowers, are a powerful remedy against the poison of the most venomous serpents."—p. 48.

Rubus trivialis, Mich. Low bush dewberry; creeping blackberry. Diffused; vicinity of Charleston; collected in St. John's; Newbern. Fl. April.

Watson's Pract. Physic, 820; U. S. Disp. 603; Pe Mat. Med. and Therap. ii, 543; Royle Mat. Med. 375; Chap. on Dis. of Thorac. and Abdom. Viscera, 279; British and For. Med. Review, Jan. 31, 1845; Ball. and Gar. Mat. Med. 268. This is, no doubt, possessed of astringent properties similar to the above; a decoction of the root is said to be a safe, sure, and speedy cure for dysentery—a remedy derived from the Oneida Indians.

As *Blackberry wine* is much used as a substitute for more costly foreign wines, I will introduce the following receipt for making it, communicated by Mrs. Summer, of South Carolina, which was said to have been introduced from Virginia by the Rev. Richard Johnson. Blackberry wine, as well as cordial made from the wild cherry, is a pleasantly stimulating beverage, useful as a cordial, capable of being medicated, and very serviceable in families, as well as in

camps and hospitals. It can easily be made with whisky, or this may be omitted. It is only strange that so useful and pleasant a drink, and one within the reach of every one, should, until recently, have been so little made: "To every three pints of berries, add one quart of water; suffer it to stand twenty-four hours, strain through a colander, then through a jelly-bag, and to every gallon of the juice add three pounds of good brown sugar, the whites of three eggs beaten to a froth, and stirred in the juice; a little spice, with two dozen cloves, beaten together, and one nutmeg grated, should be put in a small linen bag and dropped in. After all are mixed, put it in a stone jug, filled up, and kept full with some of the same juice, reserved for that purpose, until it is done working, which will be in two or three weeks. Cork it tightly, and keep it in a cold place for three or four months, then pour it off into bottles, with a little loaf sugar in each bottle; cork, and seal close. If the wine is kept for twelve months, it will be still better." It is not easy to overvalue the great utility of so mild an alcoholic drink, combining slightly astringent vegetable properties, and which may be placed within the reach of almost every one. I have seen this wine of such an agreeable flavor and taste as to be preferred to more valued wines. Cheap good wines are certainly the greatest boon that could be conferred on any country. See "Grape," *Vitis*.

The following is an approved method of making *Blackberry wine*, in vogue in St. John's, Berkley, South Carolina. I insert it in a work of this kind for its general utility, and as it forms an approved liquor which "cheers but not inebriates." Blackberries, six quarts; boiling water, two quarts; brown sugar, two pounds. The whites of six eggs frothed, added when the jug is nearly full. Mash the berries, pour in the water—let it remain twenty-four hours. Strain through a hair sieve, and add the sugar. Leave the jug open for two weeks, until fermentation ceases—then you *may* add a glass of alcohol. ("P S.") See "*Cerasus*," for manufacture of "blackberry cordial."

A correspondent in the Mobile Register gives the following method of making blackberry cordial:

CORDIAL FOR SICKNESS IN THE ARMY.—To alleviate the sufferings, and perhaps save the lives of many of our soldiers, whose sickness may be traced to the use of unwholesome water in limestone regions, I recommend the use of blackberry cordial. The following is a good recipe: Bruise the berries, and strain the juice through a bag; to each quart of the juice allow a half pound of loaf sugar, a heaped teaspoonful of powdered cinnamon, the same of powdered cloves, and a grated nutmeg; boil these ingredients fifteen or twenty minutes, skimming them well. When cool, stir into each quart a half pint of brandy; then bottle, and cork well. In case brandy and loaf sugar cannot be had, substitute good whisky and sugar-house molasses. Avoid plantation molasses, brown sugar, and bad whisky. So much for the *cure*.

To *prevent* the disorder, boil the water of the country before drinking it. The process of boiling precipitates the impurities, and when cool, the water may be poured from the sediment and used.

COMPOUND SYRUP OF BLACKBERRIES.—MEDICATED BLACKBERRIES.—Useful as a drink in diarrhœa, and to supply soldiers in camp, either as a remedy in mild cases of diarrhœa or as a vehicle for medicines. To two quarts of the juice of blackberries, add half an ounce each of cinnamon, allspice, and nutmegs, and one quarter of an ounce of cloves, well pulverized. Boil them together for fifteen to twenty minutes in a preserve pan or kettle, to get the strength of the spices; strain through a piece of flannel, then add loaf sugar to make very sweet, and while still hot add to every two quarts of the juice one pint of Cognac brandy. The dose of this for an adult is about two tablespoonfuls repeated. One-fifth portion of the mixture is brandy. The blackberry root is an easily obtained and valuable astringent. A decoction acts as an astringent, and will check diarrhœa. The rind of pomegranate, which is easily portable, boiled in milk, is an excellent remedy in

diarrhœa in the army, to be used during scarcity of medicines. The tree grows abundantly in the Confederate States; all parts of it are medicinal.

From frequent trials, I know of no remedy for diarrhœa and dysentery of teething children, superior to the decoction of the blackberry root; also, during the convalescence from dysentery in adults.

The leaves of blackberry and raspberry are recommended as substitutes for foreign tea.

Rubus occidentalis, Linn. Virginian, or wild raspberry. Grows in the upper districts; collected in St. John's; Newbern.

Mér. and de L. Dict. de M. Méd. vi, 131. Properties identical with the above. It is thought to be a specific in dysentery.

Fragaria vesca. Ex. cult. Strawberry.

Flore Med. iii, 169; Griffith Med. Bot. 277 Gesner speaks of the good effects of the fruit in calculous disorders, and Linnæus extols its efficacy in gout, having, he says, prevented paroxysms of it in himself by partaking of this fruit very freely. They are also supposed to possess vermifuge properties, and to be useful in phthisis. The leaves are astringent, and are recommended in bowel complaints; and the roots are much used in Europe as diuretics; frequently given in dysuria, in infusion, made with an ounce to the pint of water. *Op. cit.* Lallemand, in his work on Spermatorrhœa, p. 310, states that strawberries are quite serviceable in relieving irritable conditions of the bladder and urethra.

Fragaria Virginiana, Erhart. Scarlet Virginian strawberry. Rich woods; Florida to Virginia. Chap.

It was introduced into England in 1629, and possessed a fame equal to the hautbois. The pulp has a fine flavor. Rural Cyc. This plant is well known, and its economical value and application require no description. The use of

the fruit often acts beneficially upon dyspeptics, who are benefited by acids. The celebrated Rousseau was always relieved of a calculous affection by eating this fruit. See his *Confessions.* "The old Carolina strawberry is a well known and much esteemed variety. The pulp is colored and juicy, and has a fine vinous flavor." By pinching off all the first flowers of early bloom varieties, the flowers will appear and fructify the present autumn. Rural Cyc. They require constant watering to bear almost constantly.

Geum Virginianum, Linn. } White avens.
" *Carolinianum*, Walt. }

Griffith, Med Bot. 279; Raf. Med. Fl. i, 220. This plant is possessed of tonic and astringent properties, recommended by Ives and Bigelow in dyspepsia, and debility of the viscera; employed, also, with success in leucorrhœa and chronic hemorrhages. It is not supposed, however, to be possessed of much power; one drachm of the powdered root may be used, or a decoction made by one ounce to one pint of water, of which the dose is one ounce several times a day. In domestic practice, it is given in the shape of a weak decoction, as tea.

Agrimonia Eupatoria, L. Agrimony; cockle burr. Diffused in cultivated lands; Newbern. Fl. July.

Parr's Med. Dict. art. A, Sup.; Pe. Mat. Med. and Therap. ii, 76; Le. Mat. Med. i, 1251; Royle, Mat. Med. 602; Hoffman's Obs. Phys. Chim. i; Obs. i; Ell. Bot. Med. Notes, i, 403, note; U. S. Disp. 145; Ed. and Vav. Mat. Med. i, 281; Ball and Gar. Mat. Med. 431; Bergii, Mat. Med. 287; Mér. and de L. Dict. de M. Méd. i, 63; Woodv. Med. Bot.; Ann. de Chim. lxxxi, 332; Coxe, Am. Disp. 18; Shec. Flora Carol. 96; Dém. Élém de Bot. i, 442. The root and leaves, before the flowers are produced, are acrid and astringent, and are serviceable in passive hemorrhages, diarrhœa, leucorrhœa, and gonorrhœa, and are highly recommended as a deobstruent in obstructions of the spleen, and in diseases arising from torpor of the liver,

as hydrops, icterus, etc. The roots and leaves have been found efficacious in involuntary discharge of urine (enuresis). Ray's Cat. Plantarum; Am. Herbal, by I. Stearns, 89; Lightfoot's Fl. Scotica. It is styptic; it strengthens the tone of the stomach, and it has been employed in chronic diarrhœa. The plant, digested in whey, affords a very grateful diet drink. See Linnæus Veg. M. Med. 88. The Indians used it in intermittent fever. Colonel Seaborn, of Pendleton district, S. C., writes me word that he has known the plant, boiled in milk, given successfully in snake bites, and injuries arising from the stings of spiders. The dose of the powder is one drachm; of the infusion of six ounces of root in one quart of boiling water, the dose is one ounce. In popular practice, the leaves are applied as a cataplasm to contusions and fresh wounds. It is used by the steam practitioners. See Howard's Imp. Syst. Bot. Med. 284. The leaves and stalks impart a beautiful and permanent gold color to animal wool, previously impregnated with a weak solution of bismuth, and the flowers are employed by tanners for curing soft and delicate skins.

Spiræa trifoliata and stipulacea. See Gillenia.

Spiræa tomentosa, Linn. Hardhack; steeple-bush. Grows in the upper districts, and in Georgia; Newbern. Fl. July.

U. S. Disp. 682; Raf. Med. Fl. ii, 91. A valuable tonic and astringent; administered in diarrhœa, cholera infantum, and other complaints where medicines of this class are indicated. Wood says it is peculiarly adapted, by its tonic powers, to cases of debility, as it does not disagree with the stomach; but it should be avoided during the existence of inflammatory action or febrile excitement. It was employed by the Indians, and brought to the notice of the profession by Dr. Cogswell, of Conn. Dr. Ives is of the opinion that the root is the least valuable portion: tannin, gallic acid, and bitter extractive are among its constituents, and its virtues are extracted by water. Mér. and de L.

Dict. de M. Méd. vi, 507. According to Mead's Thesis, it is given with success in the second stages of dysentery and diarrhœa, having virtues attributed to it analogous to those of quinine. See, also, Journal Univ. des Sci. Méd. xxiv, 238, and Thesis in New York Med. Repos. (Mérat, *op. cit.*) The extract is said to be fully equal to catechu, and might very well take its place. As it does not disagree with the stomach, it is considered a very valuable addition to the materia medica. Griffith, Med. Bot. 280. From five to fifteen grains of extract may be taken, or two ounces of the decoction, prepared by the addition of one ounce of the plant to one pint of water. The extract is preferable; made by evaporating the decoction of the stems, leaves, or root. This is taken cold, and repeated several times during the day. Great use might be made of this plant, particularly by practitioners residing in the country. In a communication from Dr. S. B. Mead, of Illinois, he informs me that he has employed it in obstinate diarrhœas in place of opium.

Spiræa opulifolia, Linn. Nine-bark. Grows along streams.

Griffith's Med. Bot. 282. This is not so astringent as the *S. tomentosa*, though Rafinesque (Med. Flora) says it is possessed of similar properties. It has an unpleasant odor, which renders it objectionable as an internal remedy. It is, however, much employed as an external application, in the form of fomentation, or as a cataplasm to ulcers and tumors. The seeds are extremely bitter, and are said to be tonic.

Gillenia trifoliata, Nutt. } Indian physic. Grows in the
Spiræa, Linn. } upper districts; also in Geo.
Fl. July.

Big. Am. Med. Bot. iii, 10; Bart. M. Bot. 165; U. S. Disp. 353. It is a mild emetic according to some writers; largely employed as a substitute for ipecacuanha. Bigelow thinks it is not a certain emetic, but Zollickoffer, Barton, Eberle, and Griffith unite in testifying to its value;

the latter entirely disproves Baume's unfavorable report. In small doses, it acts as a gentle tonic, especially in torpid conditions of the stomach. According to Mér. and de L. Dict. de M. Méd. 509 (see *Spiræa trifol.*), its properties partake also of a stimulating character. Coxe, Am. Disp. 305; Carson's Illust. Med. Bot. pt. 1st, 40, 1847. Shreeves (Ex. in the Am. Journal Pharm. vii) found in it starch, gum, resin, wax, fatty matter, red coloring matter, and a peculiar principle, soluble in alcohol and dilute acids, but insoluble in water and ether. According to the statement of Dr. Staples, it contains no emetine. It may be conveniently given as an emetic, by boiling the root and giving one or two ounces of the decoction at a dose till vomiting is induced. "The tincture of the root is an infallible remedy for milk sickness." Cherokee Doctor. The dose of the powdered root is thirty grains, persisted in till vomiting takes place; two to four grains act as a tonic, and sometimes as a sudorific. The infusion will occasionally produce hyperemesis and catharsis. Lind. Nat. Syst. 144; Frost's Elems. 80; Inaug. Diss. of Dr. De La Motta, of Charleston, published in Philadelphia; Schoepf, M. Med. 80; Bart. M. Med. 26; Griffith's Med. Bot. 283; Griffith, in Journal Phil. Coll. Pharm. iv, 177.

Gillenia stipulacea, Nutt. } Grows on the Saluda mountains. Fl. July.
Spiræa of Mich. }

Lind. Nat. Syst. Bot. 144. It is emetic, and probably tonic, and is possessed of properties similar to those of the *S. trifol.*, though it is said to be more certain in its effects, and not to have been deteriorated by cultivation. U. S. Disp. 353; Griffith's Med. Bot. 284.

Cratægus crus galli. Grows in swamps.

Mér. and de L. Dict. de M. Méd. ii, 460. Dr. Darlington regards it as one of the best thorn plants for hedges; it is much used in Delaware. Fl. Cestrica. It is better than the Washington thorn, *C. cordata.*

Pyrus coronaria, Linn. Crab-apple. Newbern. Fl. May. It is not employed medicinally. The fruit is very acid to the taste, and is often made into preserves. The bark, with that of the white hickory, gives a yellow dye. Alum must be used as a mordant. The yarn should first be boiled with soap and water, then wrung out, and boiled in the preparation.

Pyrus malus. Cultivated. The apple, pear (*P. communis*), and quince (*P. cydonia*), grow very well in the Confederate States. The pulp surrounding the seeds of the latter is often dissolved in water, and used as a mucilage. See authors.

Perry from pears is made very much like cider. Hitt's method of keeping pears and apples is described by Wilson in his Rural Cyc. Art. "Fruit storing." Having prepared a number of earthenware jars, and a quantity of dry moss (different species of *hypnum* and *sphagnum*), he placed a layer of moss and of pears alternately, till the jar was filled; a plug was then inserted, and sealed around with melted rosin. These jars were sunk in dry sand to the depth of a foot—preferring a deep cellar for keeping them to any fruit room. Millar's plan is also described. After sweating and wiping, in which operation great care must be taken not to bruise the fruit, the pears are packed in close baskets, having some wheat straw in the bottom and around the sides, to prevent bruising, and a lining of thick, soft paper, to hinder the musty flavor of the straw from infecting the fruit. Only one kind of fruit is put in each basket. A covering of paper and straw is fixed on the top, and the basket is then deposited in a dry room, secure against the access of frost; and the less air is let into the room the better the fruit will keep. Some preserve apples and pears in glazed earthenware jars, with tops, by placing dried sand between each layer of fruit—the jars to be kept in a dry, airy situation, secure from frost.

The gum exuding from the apricot tree dissolved in water acts as a substitute for gum arabic, as an adhesive

agent; see, also, *Bletia aphylla.* I find that from the wild orange, in boiling water, acts admirably as a glue for paper. The wood of the pear and apple is very hard, and will probably supply some of our best material for wood engraving; see *Amelanchier*, with which it is closely related. The pear and apple are employed to make wooden type for mammoth letters. The apple is the best material for plane stocks, as it becomes harder and more polished the more it is used. A species of wine is made from apple cider by adding sugar and alcohol. Cider may be kept by digging under ground dry cellars, and covering from the sun. Vinegar made from cider is of the best quality. It is easily made in a warm place by adding a little mother of vinegar to the sour cider in a barrel. It is ready for use in a few weeks. The strength and purity of vinegar, as determined by the framers of the United States Pharmacopœia, is as follows: "One fluidounce is saturated by about thirty grains of crystallized bicarb. of potassa. It affords no precipitate with solution of chloride of barium, and is not colored by sulphohydric acid."

The bug, or plant louse, which in the shape of a hoary covering destroys the apple tree, is generally an *aphis* or an *eriosoma;* see Wilson's Rural Cyclopædia, a full account; also, papers on the "Insects destructive to Trees," in Patent Office Report on Agriculture. In these the remedies are given. "The best of the methods, as to at once cheapness, cleanliness, and efficiency, are syringing with soap suds and tobacco water, minutely brushing with spirits of turpentine, brushing with a mixture of soap lees and one of oil of turpentine, and brushing with brown, impure, pyroligneous acid." Wilson. See "peach," "pear," mode of keeping, etc. Planting apricots near by will divert the insects to their fruit. Turning hogs in orchards, which consume the fallen fruit, is one of the best means of destroying the larvæ, which produce the fly of the next season.

Good cider is deemed a pleasant, wholesome liquor during the heats of summer; and Mr. Knight has asserted,

and also eminent medical men, that strong, astringent ciders have been found to produce nearly the same effect in cases of putrid fever as Port wine.

The unfermented juice of the apple consists of water and a peculiar acid called the *malic acid*, combined with the saccharine principle. Where a just proportion of the latter is wanting, the liquor will be poor and watery, without body, very difficult to preserve and manage. In the process of fermentation, the saccharine principle is in part converted to alcohol. Where the proportion of the saccharine principle is wanting, the deficiency must be supplied either by the addition of a saccharine substance before fermentation, or by the addition of alcohol after fermentation; for every one must know that all good wine or cider contains it, elaborated by fermentation, either in the cask or in the reservoirs at the distillery. The best and cheapest kind is the *neutral spirit*—a highly rectified and tasteless spirit, obtained from New England rum. Some, however, object to any addition of either sugar or alcohol to supply deficiencies, forgetful that these substances are the very elements of which all wine, cider, and vinous liquors are composed.

The strength of the cider depends on the specific gravity of the juice on expression: this may be easily ascertained by weighing, or by the hydrometer.

Newark, in New Jersey, is reputed one of the most famous places in America for its cider. The cider apple most celebrated there is the Harrison apple, a native fruit; and cider made from this fruit, when fined and fit for bottling, frequently brings ten dollars per barrel, according to Mr. Coxe. This and the Hughs' Virginia Crab are the two most celebrated cider apples of America. Old trees, growing in dry soils, produce, it is said, the best cider. A good cider apple is saccharine and astringent.

To make good cider, the first requisite is suitable fruit; it is equally necessary that the fruit should be not merely mellow, but *thoroughly mature*, rotten apples being excluded; and ripe, if possible, at the suitable period, or about the

first of November, or from the first to the middle, after the excessive heat of the season is past, and while sufficient warmth yet remains to enable the fermentation to progress slowly, as it ought.

The fruit should be gathered by hand, or shaken from the tree in dry weather, when it is at perfect maturity; and the ground should be covered with coarse cloths or Russia mats beneath, to prevent bruising, and consequent rottenness, before the grinding commences. Unripe fruit should be laid in large masses, protected from dews and rain, to *sweat* and hurry on its maturity, when the suitable time for making approaches. The earlier fruits should be laid in thin layers on stagings, to preserve them to the suitable period for making, protected alike from rain and dews, and where they may be benefited by currents of cool, dry air. Each variety should be kept separate, that those ripening at the same period should be ground together.

In grinding, the most perfect machinery should be used to reduce the whole fruit, skin, and seeds, to a fine pulp. This should, if possible, be performed in cool weather. The late Joseph Cooper, of New Jersey, has observed emphatically, that "*the longer a cheese lies after being ground, before pressing, the better for the cider, provided it escapes fermentation until the pressing is completed;*" and he further observes, "that a sour apple, after being bruised on one side, becomes rich and sweet after it has changed to a brown color, while it yet retains its acid taste on the opposite side." When the pomace united to the juice is thus suffered for a time to remain, it undergoes a chemical change; the saccharine principle is developed; it will be found rich and sweet. Sugar is in this case produced by the prolonged union of the bruised pulp and juice, which could never have been formed in that quantity had they been sooner separated.

Mr. Jonathan Rice, of Marlborough, who made the premium cider so much admired at Concord, Massachusetts, appears so sensible of the important effects of mature or *fully ripe* fruit, that, provided this is the case, he is willing

even to forego the disadvantage of having a portion of it quite rotten. Let me observe, that this rottenness must be the effect, in part, of bruises by improper modes of gathering, or by improper mixtures of ripe and unripe fruit. He always chooses cool weather for the operation of grinding; and, instead of suffering the pomace to remain but twenty-four hours or forty-eight hours at most before pressing, as others have directed, he suffers it to remain from *a week to ten days*, provided the weather will admit, stirring the mass daily till it is put to the press. See his communication in vol. vii, p. 123, N. E. Farmer.

The first fermentation in cider is termed the vinous: in this the sugar is decomposed, and loses its sweetness, and is converted into alcohol; if the fermentation goes on too rapidly, the cider is injured; a portion of alcohol passes off with the carbonic acid.

The design of frequent rackings is principally to restrain the fermentation; but it seems to be generally acknowledged that it weakens the liquor. It is not generally practised, although the finest cider is often produced by this mode. Various other modes are adopted with the view of restraining fermentation—one of which is the following: After a few gallons of cider are poured into the hogshead into which the cider is to be placed when racked off, a rag six inches long, previously dipped in melted brimstone, is attached by a wire to a very long, tapering bung; on the match being lighted, the bung is loosely inserted; after this is consumed, the cask is rolled or tumbled till the liquor has imbibed the gas, and then filled with the liquid. This checks the fermentation; yet the French writers assure us that the effect of much sulphuring must necessarily render such liquors unwholesome.

Black oxide of manganese has a similar effect; the crude oxide is rendered friable by being repeatedly heated red hot, and as often suddenly cooled by immersion in cold water. When finely pulverized, it is exposed for a while to the atmosphere, till it has imbibed again the oxygen which had been expelled by fire. An ounce of powder is deemed

sufficient for a barrel. If the cider is desired to be very sweet, it must be added before fermentation, otherwise not till afterward. Mr. Knight, from his long experience and observation in a country (Herefordshire, England) famous for its cider, has lately, in a letter to the Hon. John Lowell, stated that the acetous fermentation generally takes place during the progress of the vinous, and that the liquor from the commencement is imbibing oxygen at its surface. He highly recommends that new charcoal, in a finely pulverized state, be added to the liquor as it comes from the press, in the proportion of eight pounds to the hogshead, to be intimately incorporated; "this makes the liquor at first as black as ink, but it finally becomes remarkably fine."

Dr. Darwin has recommended that the liquor, as soon as the pulp has risen, should be placed in a cool situation, in casks of remarkable strength, and the liquor closely confined from the beginning. The experiment has been tried with good success; the fermentation goes on slowly, and an excellent cider is generally the result.

A handful of well powdered clay to a barrel is said to check the fermentation. This is stated by Dr. Mease. And with the view of preventing the escape of the carbonic acid, and to prevent the liquid from imbibing oxygen from the atmosphere, a pint of olive oil has been recommended to each hogshead. The excellent cider exhibited by Mr. Rice was prepared by adding two gallons of New England rum to each barrel when first made. In February or March it was racked off in clear weather, and two quarts more of New England rum added to each barrel. Cider well fermented may be frozen down to any requisite degree of strength. In freezing the watery parts are separated, and freeze first, and the stronger parts are drawn off from the centre. I finish by adding the following general rules—they will answer for all general purposes; they are the conclusions from what is previously stated: 1. Gather the fruit according to the foregoing rules; let it be *thoroughly ripe* when ground, which should be about the

middle of November. 2. Let the pomace remain from two to four days, according to the state of the weather, stirring it every day till it is put to the press. 3. If the liquor is deficient in the saccharine principle, the defect may be remedied in the beginning by the addition of saccharine substances or alcohol. 4. Let the liquor be immediately placed in a cool cellar, in *remarkably strong, tight, sweet* casks; after the pulp has all overflown, confine the liquor down by driving the bung hard, and by sealing; a vent must be left, and the spile carefully drawn at times, but only when absolutely necessary to prevent the cask from bursting. The charcoal, as recommended by Mr. Knight, deserves trial.

Fresh and sweet pomace, directly from the press, and boiled or steamed, and mixed with a small portion of meal, is a valuable article of food, or for fattening horses, cattle, and swine.

Sour casks are purified by pouring in a small quantity of hot water, and adding unslacked lime; bung up the cask, and continue shaking it till the lime is slacked. Soda and chloride of lime are good for purifying. When casks are emptied to be laid by, let them be thoroughly rinsed with water and drained, then pour into each a pint of cheap alcohol, shake the cask and bung it tight, and it will remain sweet for years. Musty casks should be condemned to other uses. Cider should not be bottled till *perfectly fine*, otherwise it may burst the bottles. The bottles should be strong, and filled to the bottom of the neck. After standing an hour, they should be corked with velvet corks. The lower end of the cork is held for an instant in hot water, and it is then instantly after driven down with a mallet. The bottles must be either sealed or laid on their sides in boxes, or in the bottom of a cellar, and covered with layers of sand.

Most of the above information relative to cider making is derived from the American Orchardist, by W Kenrick, of Boston, Massachusetts, whose list of apple and other nursery trees comprehends almost every kind desirable for any purpose.

The reader will find very explicit instructions for the manufacture of cider in the Penny Cyclopædia, vol. vii, p. 161; in the Lib. of Useful Know.; British Husb. vol. ii, p. 364; Low's Pract. Agr. p. 379; Croker, On the Art of Making and Managing Cider; in the Quart. Journal of Agr. vol. viii, p. 332, by Mr. Towers; and in Baxter's Agr. Lib. p. 135, by Andrew Crosse, Esq., of Somerset. The following instructions for making cider are by a Devonshire lady: Gather the fruit when ripe; let it remain in a heap till the apples begin to get damp, then grind them in a mill (similar to a malt mill); take the pulp and put it into a large press like a cheese press, only on a much larger scale; place a layer of reed in the bottom of the vat and a layer of pulp alternately until the vat is full. The vat is square, and the ends of the reed must be allowed to turn over every layer of pulp, so as to keep it from being pressed out at the sides. The layers of pulp must be five or six inches thick. When you have finished making your cheese, press it as hard as you can, and let it remain three or four hours; then cut down the corners of it, and lay them on the top with reed as before; then press it again, and allow it to remain for another three or four hours. Repeat this process as long as necessary, or until the cheese is quite dry. It takes seven bags of apples for one hogshead of cider, and the vat ought to be large enough to make from three to four hogsheads at a time. The best sort of apple to make mild cider is the hard bitter-sweet. Any sort of sour apple will do to make the harsh cider. The liquor must be strained through a fine sieve into a large vessel, and allowed to ferment for three or four days, taking off the scum as it rises; then rack it, and put it into casks stopped down quite close. Before the cider is put into the cask, a match made of new linen, and attached to a wire, is lighted and put into the cask, and the bung is put in to keep the wire from falling into it. After a few minutes the match is removed, and the cider poured into the cask while yet full of the smoke.

A person would require three or four years experience

before he would be qualified to superintend the making of sweet or made cider. Much depends on the year, or rather on the ripening of the apples; it should be the *second*, not the *first falling;* and the "green bitter-sweet," and the "pocket-apple," are the best for making it. After pounding, isinglass and brimstone are used to sweeten and fine it, and many other ingredients.

The *sweet* cider, above described, is distinct from the other two kinds of cider (the harsh and mild). Cider, according to Brande, contains about $\frac{9}{87}$ parts per cent. of alcohol. It is a wholesome beverage for those who use much bodily exercise. Willich's Dom. Enc.; McCulloch's Com. Dict.

Under this genus, I insert the following from Chaptal's Chemistry Applied to Agriculture, as the subject of the manufacture of Liquors from fruits, grain, etc., is important in the present exigency: "Good water is undoubtedly the most wholesome drink; but man has almost everywhere contracted the habit of using fermented liquors, and this habit has created in him a want of them; so that if he be deprived of their use, he loses his strength and energy, and becomes less able to work. The best fermented drink is wine; but excepting the wine countries, where the low price of ordinary wine renders the use of it common, the laborer has seldom the means of procuring it daily. It is, therefore, necessary that its place should elsewhere be supplied by such other liquors as will produce nearly the same effect, and this is done by the fermentation of grains, fruits, milk, the sap of trees, etc., from the product of which there is formed in Europe a great variety of liquors; some of these have become very important articles of consumption and of commerce. The peasants, in the greater part of our districts, have acquired the habit of preparing their liquors from the fermentation of most of these substances; and as the only object I have in view is to furnish information in regard to extending and perfecting these processes, I shall confine myself to pointing out such methods as are easily executed, and which require the em-

ployment of such substances only as are everywhere in the hands of the agriculturist:

"All mucilaginous fruits, all fleshy stone fruits, excepting those which yield oil, all grains which contain gluten, sugar, or starch, are capable of undergoing the spiritous or alcoholic fermentation.

"The expressed juice of saccharine fruits may be made to ferment by exposure to a sufficient degree of heat. The method most commonly pursued is that of crushing or grinding the fruits, and thus fermenting the pulp with the juice; in this manner are treated apples, pears, grapes, cherries, etc.

"For such fruits as are not very juicy, but contain, however, some sugar and mucilage, and for such as can be made to keep better by being dried, some water is employed to mix and dissolve the fermentable principles. In this class of fruits may be placed those of the service tree, the cornelian cherry, the medlar, the mulberry, the privet, the juniper, the Neapolitan medlar, the thorn apple, the wild plum, etc., and with them the dried fruits of the plum and fig tree, and some of the other trees and shrubs before mentioned.

"To produce the development of the saccharine principle in bread corns by germination, they must be moistened with water; the spiritous fermentation is afterward excited in them by immersing them in water containing the yeast of beer, or leaven made of wheat flour. The operation of germination may even be suppressed by mixing the meal with a portion of leaven and of lukewarm water. This dough may be allowed to ferment for twenty-four hours, and may then be gradually diluted with water; fermentation will take place in a few hours, and will go on regularly during two or three days. As directions for the manufacture of cider, perry, and beer for general consumption are much less necessary here than those for procuring for farmers (or soldiers, I add,) wholesome liquors at a trifling expense, I shall confine my observations to this object. Grapes furnish the best liquor,

and that in the greatest quantity; but when this is drunk clear, it serves but little purpose for quenching thirst; when made use of in large quantities, it impairs the strength. The liquor called *piquette*, which is manufactured by our farmers, supplies advantageously the place of wine, serving as a tonic, and at the same time quenching thirst. *Piquette* is made from the pressed and fermented mash of red grapes, by means of water filtrated through it till it acquires, in some degree, the color and appearance of wine; it is, even in this state, a better drink than water, inasmuch as it is slightly tonic; its good qualities may, however, be much increased by fermentation. *Piquette* can be kept but a short time unchanged, and, from this tendency to sour, it is necessary that it should be made only in such quantities as are immediately wanted, and that the manufacture of it should be continued at intervals throughout the year. For this purpose the pressed mash of red grapes is put into a cask, care being taken to crowd it in till the cask is completely full, after which it is hermetically closed, so as to exclude air and moisture, and set in a cool, dry place. When the *piquette* is to be prepared for use, the head is taken out of the cask, and water is thrown upon the mash until the whole mass is moistened with it, and the water stands upon the top; fermentation soon takes place, as becomes evident by the light foam which arises; it is completed by the end of the fourth or fifth day; from this time the liquor may be drawn off for daily use—the place of the portion removed being supplied by an equal quantity of water thrown in upon the top of the mash. In this manner a cask of mash, of the capacity of sixty-six gallons, may furnish about four gallons of drink per diem, and will continue to yield it for about twenty days.

"As the mash of white grapes cannot be made to ferment with the juice, this last is separated and put into casks to ferment by itself, and the *piquette* is then made by adding to the mash the necessary quantity of water. This liquor is more spiritous than that made from red grapes, and

keeps better; it is therefore reserved for use during the latter part of the summer. If instead of throwing pure water upon the mash as is everywhere done, this liquid should first be slightly sweetened and heated, and then receive the addition of a little yeast, *piquette* of a very superior quality would be obtained. In the absence of yeast or leaven, the scum which arises upon wine, especially white wine, during fermentation, may be used for the sâme purpose; this foam or scum may be dried, and thus preserved for use without undergoing any change.

"Well made *piquette* is a very wholesome drink for country people, for its tonic properties, as well as its power of quenching thirst; *it is far preferable, as a daily drink, to wine;* but this resource is only local, as in most countries that are most fruitful in grapes, if the harvest fall short, there can be but little *piquette* made; it is necessary then to be able to supply its place from some other source, and this is done by the fermentation of certain fruits.

"Apples and pears, as being the fruits that are most abundantly produced, are the most valuable for the purpose of manufacturing liquors. A mixture of the two produces a more wholesome article of drink than does either treated separately. The juices of plums and other fruits may likewise be added, as their astringency renders the liquor more tonic. Excellent liquor may be produced, both from apples and pears, by following the well known method of making cider, which consists in grinding the fruit with a millstone, and fermenting the pulp and juice together; but upon farms, where we seldom find the means of preserving liquors unchanged, it is necessary that the processes be simple, and such as can be made use of for preparing them as they are needed. I shall, therefore, recommend the following method: Begin to collect the apples and pears which fall from the trees toward the end of August, and continue to do so till they have arrived at maturity; cut them in pieces as fast as they are gathered; dry them first in the sun, and afterward in an oven from which the bread has been drawn. If the fruit be well

dried in this manner, though it may grow dark colored, it may be kept unchanged for several years. When drink is to be prepared from these dried fruits, put about sixty pounds of them into a cask, which will contain sixty-six gallons; fill the cask with water, and allow it to remain four or five days; after which, draw off the fermented liquor for use. The liquor thus prepared is very agreeable to the taste; when put into bottles it ferments so as to throw out the cork as frothing Champagne wine does. Though wholesome and agreeable, it may become still more conducive to health by mixing with the apples and pears one-twentieth of the dried berries of the service tree *Amelanchier canadensis* (*Aronia botryapium*, Ell. Sk., which grows in Carolina), and one-thirtieth of juniper berries; from these the liquor acquires a slightly bitter taste, and the flavor of the juniper berries, which is very refreshing, and it is besides rendered tonic and antiputrescent. The use of this drink is one of the surest means that can be taken by the husbandman for preserving himself from those diseases to which he is liable in autumn, and for the attacks of which he is preparing the way during the greatest heats of summer.

"After the spiritous portions of the liquor have been drawn off, very agreeable *piquette* may be made from the pulp which remains in the cask; for this purpose it is only necessary to crush the fruit, which is already soft, and to add to it as much lukewarm water, to which a small quantity of yeast has been added, as will fill the cask, fermentation commencing in a short time, and terminating in three or four days. To flavor this liquor and render it slightly tonic, there may be added to it before fermentation a handful of vervain, three or four pounds of elder berries, and of juniper berries.

"Cherries, and particularly the small bitter cherries, when ground and afterward fermented in a cask, in the same manner as the mash of grapes, and then pressed to separate the juice from the pulp, furnish a liquor containing much spirit. The wine made from cherries, when distilled, af-

fords an excellent liquor, which, although not exactly the same as the good *Kirschwasser* of the Black Forest, is yet a valuable drink, and is sold in commerce under the same name.

"The berries of the service tree, dried in an oven, and put into a cask in the proportion of about sixteen or eighteen pounds of fruit to twenty-six and a half gallons of water, furnish, after four or five days fermentation, a very good drink. Plums and figs, dried either by the sun or in an oven, may be made use of for the same purpose. In order to render the liquor more wholesome, or more agreeable, several kinds may be mixed together, and thus the defects of one kind may be compensated for by the good qualities of the other. A few handfuls of the red fruit of the bird-catcher service tree counteract the flat, sweetish taste of certain other fruits.

"In our farming districts the berries of the juniper are carefully collected and fermented, in the proportion of about thirty pounds of berries to thirty-eight and a half gallons of water. The drink procured from these is one of the most wholesome possible, but it requires a little use to reconcile one to the odor and flavor of it; those, however, who drink it, prefer it after a short time to any other liquor. The juice of the juniper contributes so much to health that I cannot too strongly recommend its being mixed, in greater or less quantities, with all fruits which are to be subjected to fermentation; its flavor alone will disguise the taste of such liquors as, without being unwholesome, are flat, sickish, or otherwise unpleasant. Count Chaptal probably refers here to the juniper growing in Holland, from which gin is procured. Our common red cedar, growing in South Carolina (*Juniperus Virginiana*), is closely related to the European juniper, and the berries, perhaps, may be used in flavoring drinks, and the leaves employed in place of savin. See *Juniperus*.

"The rinds of oranges or lemons, aromatic plants, angelica roots (grow in South Carolina), peach leaves, etc., may likewise be mixed with any of these fruits which are

naturally too sweet, and thus serve to raise the flavor of the fermented liquor, and render it more strengthening and efficacious in preventing the attack of disease.

"I do not doubt but that by the application of the true principles of science, and by employing only those products which nature yields us abundantly and without expense, we can procure from the husbandman a variety of drinks more healthy, more agreeable, and better adapted for quenching thirst than the weak and imperfectly fermented wines made from green grapes.

"I have limited myself to pointing out the simplest methods in which such articles as are within the reach of every peasant may be made use of; if such liquors as are more spiritous be wished, they can be obtained by dissolving from four to six pounds of the coarsest kinds of sugar in from five and a half to ten and a half gallons of warm water, and throwing the solution upon the mash when the cask is filled with it, supposing the cask to contain sixty-six gallons. To this may be added any number of pounds of raisins.

"Liquors suitable for drinking may likewise be manufactured from the sap of several kinds of trees. In Germany, Holland, and some parts of Prussia, as soon as the returning warmth of spring begins to cause the ascent of the sap, holes two or three inches deep are bored with a gimlet in the trunks of the birch trees; through the straws which are introduced into the gimlet holes there flows out a clear, sweet juice, which, after having been fermented for a few days, becomes a sprightly liquor, that is drunk by the inhabitants of those countries with much pleasure. It is thought by them to be very serviceable in counteracting affections of the kindneys, stomach, etc. A single tree will furnish a quantity of drink sufficient to last three or four persons a week. The natives of the Coromandel coast fabricate their *calore* from the sap of the cocoanut tree. The savages of America prepare their *chica* from the juice of the maize, and the drink of the negroes of Congo is made from the juice of the palm tree.

"It cannot be doubted that the sap of all those trees which afford a saccharine substance can be made to yield a spiritous liquor, but I mention only these few as instances, because our own wants may be abundantly supplied from our fruits and grain.

"The fermentation of rye and barley has afforded, from time immemorial, a liquor which has supplied the place of wine for the use of the common people in nearly all those countries in which the vine cannot be made to flourish; in those where wine is made abundantly the use of beer is still very extensive, both on account of the nutritive qualities which it possesses in a high degree, and its power of quenching thirst. Though beer may be brewed upon so small a scale as to supply the wants of a single family, I shall enter into no explanation of the process. In Russia a wholesome drink called *quass* is made. One-tenth part of the rye to be employed in its manufacture is steeped in water till it becomes soft; it is then spread thinly upon planks, in a place warm enough to produce germination, and it is there sprinkled occasionally with warm water. The remainder of the rye, after having been ground, is mixed with the germinated grain, and the whole is diluted with two gallons and a half of boiling water; the vessel is then set into an oven, from which bread has just been drawn, or exposed to an equivalent degree of heat, during twenty-four or thirty hours; if the vessel be put into an oven which it is necessary to heat every day, it may be removed during baking, and returned again after the bread is taken out. After this first operation, the fermented substance is diluted by mixing with it two and a half gallons of water at the temperature of 12° or 15° (If of the Centigrade, 53° to 59°; if of Réaumur, to from 59° to 65°.) This mixture is stirred for half an hour, and then allowed to settle. As soon as a deposit is formed and the liquor becomes clear, it is then thrown into a cask, where fermentation takes place; this is completed in a few days, when the cask is removed into a cellar, and the *quass* soon becomes clear. It is in this state that it is drunk by the peasants; but it is

much improved by being drawn off in jugs as soon as it has formed its deposit in the cask, and bottled, after having been preserved in these vessels till it has become clear. The liquor prepared in this manner has a vinous and sharp flavor, which is not unpleasant. The color of it is not very precise, being of a yellowish white. The imperfections of *quass* might easily be remedied by adding wild apples, or pears, or juniper berries, to the fermented substances. The fermented liquor might be racked off several times from its lees, and clarified by the same process which we use for wine. The different deposits which are formed during the manufacture of *quass* are entirely of malt, and afford a nourishing and fattening food for animals." The reader is referred to same authority for other methods of manufacturing drinks, beverages, etc., from articles furnished on our farms.

On the subject of fermentation, Chaptal gives the following hints, which may avail us in our experiments upon the production of wine. It seems to me that they convey some doctrines similar to those brought forward by Professor William Hume, of South Carolina, in his ingenious essay:

"Generally speaking, the French grapes, when ripe, contain such proportions of sugar and the vegeto-animal principles as are well adapted for producing the vinous fermentation; but when the summer is cold or damp the proportion of sugar is less, and the predominance of the mucilage (it is from this mucilage that vinegar is formed) renders the liquor weak. In this case the *small quantity of alcohol which is developed is not sufficient to preserve* the wine from spontaneous decomposition, and at the return of heat a new fermentation takes place, the product of which is vinegar. This evil may be easily obviated by artificial means; it is only necessary to add to the liquor such a quantity of sugar as would naturally have been found in it under usual circumstances." Professor Hume advises the addition of alcohol, I believe, to preserve the wine from the acetic fermentation. See also "Treatise on Rural Chem-

istry," by Ed. Solly, F R. S. From Lond. ed. Philada. 1852; articles on manufacture of wine, brandy, etc., from fruits and vegetables. Several articles on manufacture of wine can be found in Patent Office Reports. See "Grape."

A harvest drink is made by adding ten gallons of water to half a gallon of molasses, a quart of vinegar, and four ounces of ginger. Let the water be fresh from the spring or well; stir the whole well together, and a refreshing drink is obtained.

Pyrus communis. Pear.

Fruit trees, particularly the pear, were formerly introduced into hedge-rows. It was objected that depredations would be made upon the hedge. Gerard, who wrote on this subject three hundred years ago, said: "The poore will breake downe our hedges, and wee have the least part of the fruit. Forward, in the name of God; grafte, set, plant, and nourish up trees in every corner of your ground. The labor is small, the cost is nothing, the commodity is great; yourselves shall have plenty, the poore shall have somewhat in time of want to relieve their necessity, and God shall rewarde your good mindes and diligence." See paper on "Best trees for hedges," in Pat. Office Reports, 1854, p. 416. To manufacture perry, cider, etc., consult Wilson's Rural Cyc.; Ure's Dictionary of Arts, etc.; see, also, "Apple."

Dr. John Lindley has written a most instructive article on fecundation in plants, physiological principles, and methods upon which fruits are produced. See his "Guide to the Orchard and Kitchen Garden," and a condensation in Patent Office Reports, 1856, p. 244. He says that some fruits of excellent qualities are bad bearers, and recommends the following modes of remedying these defects: 1st, by ringing the bark; 2d, by bending branches downward; 3d, by training; 4th, by use of different kinds of stocks. All these practices are intended to produce the same effects by different ways: "Physiologists know that whatever tends to cause a rapid diffusion of the sap and

secretions of any plant, causes also the formation of leaf buds instead of flower buds; and that whatever on the contrary tends to cause an accumulation of sap and secretions, has the effect of producing flower buds in abundance;" so that a flower bud is often only a contracted branch. By arresting the motions of the fluids and secretions in a tree, we promote the production of flower buds. See, also, same volume, for mode of preservation and transportation of seeds, with the longevity of seeds, their utility, and germinative powers. A long list is given of the length of time which seeds can be preserved.

Pyrus Americana, D. C. (*Sorbus microcarpa*, Ph.) Highest mountains of North Carolina. Fruit acid.

This plant yields malic acid. I insert the following from Ure's Dictionary (Farmer's Encyclopædia):

Malic acid. This vegetable acid exists in the juices of many fruits and plants, alone, or associated with the citric, tartaric, and oxalic acids; and occasionally combined with potash or lime. Unripe apples, pears, sloes, barberries, the berries of the mountain-ash, elder-berries, currants, gooseberries, strawberries, raspberries, bilberries, bramble-berries, whortleberries, cherries, ananas, afford malic acid; the house-leek and purslane contain the malate of lime.

The acid may be obtained most conveniently from the juice of the berries of the mountain-ash, or barberries. This must be clarified by mixing with white of egg, and heating the mixture to ebullition; then filtering—digesting the clear liquor with carbonate of lead till it becomes neutral; and evaporating the saline solution till crystals of malate of lead be obtained. These are to be washed with cold water, and purified by recrystallization. On dissolving the white salt in water, and passing a stream of sulphuretted hydrogen through the solution, the lead will be all separated in the form of a sulphuret, and the liquor, after filtration and evaporation, will yield yellow, granular crystals, or cauliflower concretions, of malic acid, which may be blanched by redissolution and digestion with bone-black, and recrystallization.

Malic acid has no smell, but a very sour taste, deliquesce by absorption of moisture from the air, is soluble in alcohol fuses at 150° Fahr., is decomposed at a heat of 348°, an affords by distillation a peculiar acid—the pyromalic. I consists, in 100 parts, of 41.47 carbon, 3.51 hydrogen, an 55.02 oxygen; having nearly the same composition as citri acid. A crude malic acid might be economically extracte from the fruit of the mountain-ash (*Sorbus acuparia*), applicable to many purposes; but it has not hitherto bee manufactured upon a great scale.

Pyrus Americana, D. C.
Sorbus Americana, Willd.
" *acuparia*, Mx.
" *microcarpa*, Ell. Sk.
Mountain ash. Grows on the highest mountains of South Carolina. Fl. July.

Dém Élém de Bot. 655. The flowers are purgative The oil from the young branches is caustic, and is employed against ringworm.

Amelanchier canadensis, L. (*Aronia botryapium* of Ell. Sk.) Wild currant; shade trees; service tree. Upper country. Sarrazins; St. John's, S. C.; woods Fla. to Miss., Chapman; Newbern; Croom's Catalogue.

Upon examining with a sharp instrument the specimens of various Southern woods, deposited in the museum of the Elliott Society by Professor L. R. Gibbes, Dr. A. M. Foster, and W Wragg Smith, Esq., I was struck with the singular weight, density, and fineness of this wood. I think I can confidently recommend it as one of the best to be experimented with by the wood engraver. It is also, it will be observed, closely allied to the apple, pear, etc., which are all hard. From my brief examination of the excellent and useful collection above referred to, I would arrange the hard woods as follows, those just cited taking the first rank: next in order, Dogwood, Farcleberry (*Vaccinium arboreum*), Redberry, (*Azalea nudiflora*), and *Kalmia latifolia*. The Holly (*Ilex opaca*) I find to be quite hard when well dried. The beech (*Fagus sylvatica*), the hornbeam (*Ostrya*

Virginica), indigenous plants, have all been recommended for the purposes of the engraver.

While engaged in completing a number of wood engravings for my prize Essay for the South Carolina Medical Association, I used a piece of well seasoned dogwood, and obtained a very good impression from coarse figures cut with the graver's tools. I find that none, so far experimented with, equal the boxwood, but I have not yet fully tested the woods put to season.

See *Kalmia*, etc.

See apple (*Pyrus malus*) for stimulating beverages made from the fruit of the service tree.

Prunus Virginiana. See *Cerasus.* Several South Carolina species furnish fruit, which is eatable, and often employed for various domestic purposes.

Cerasus serotina, T. & Gray. } Wild cherry. Diffused in
Prunus Virginiana, Ell. Sk. } upper and lower districts; Newbern. Fl. May.

U. S. Disp. 576; Journal Phil. Coll. Pharm. x, 197, and xiv, 27; Eberle, Mat. Med. 300; Bell's Pract. Dict. 389; Pe. Mat. Med. and Therap. ii, 538; Le. Mat. Med. ii, 487; Phil. Trans. 418, and Michaux, N Am. Sylva, ii, 205; Ball and Gar. Mat. Med. 273; Cullen, Mat. Med. 288; Lind. Nat. Syst. Bot. 147; Woodv. Med. Bot.; Griffith, Med. Bot. 288; Carson's Illust. Med. Bot. pt. 1. This is undoubtedly one of the most valuable of our indigenous plants. The bark unites with a tonic power the property of calming irritation and diminishing nervous excitability, "adapted to cases where the digestive powers are impaired, and with general and local irritation existing at the same time." It is peculiarly suited to the hectic fever attending scrofula and consumption, owing to the reduction of excitability which it induces, it is supposed, by the hydrocyanic acid contained in it. Eberle states that the cold infusion had the effect of reducing his pulse from seventy-five to fifty strokes in the minute. In a case of hypertrophy

with increased action of the heart, I tried the infusion of this plant, taken in large quantities, according to Dr. Eberle's plan, but without very satisfactory results. It was persisted in for three weeks; the patient, a gentleman aged twenty-five, of nervous temperament, drinking several ounces of it three times a day. The force of the circulation was at first diminished; but the abatement was not progressive; the individual was not made any worse by it. Tincture of digitalis had been likewise used with no beneficial effects. Dr. Wood speaks of the employment of the wild cherry in the general debility following inflammatory fever. It is valuable, also, in dyspepsia, attended with neuralgic symptoms. Mér. and De L. Dict. de M. Méd. v, 159; Bull des Sci. Méd. xi, 303. The bark is indicated whenever a tonic is necessary, from impairment of the constitution by syphilis, dyspepsia, pulmonary, or lumbar abscess, etc. I am informed by a correspondent that he finds equal parts of this bark, rhubarb, and the gum exuding from the peach tree (*Amygdalus communis*), which likewise affords Prussic acid, when combined with brandy and white sugar, an excellent remedy in dysentery and diarrhœa; one ounce of each is added to one pint of brandy, with a sufficient quantity of white sugar, a tablespoonful of which is taken every half hour. The sensible, as well as the medicinal properties of this plant, are impaired by boiling; cold water extracts its virtues best. The inner bark is officinal. The bark of all parts of the tree is used, but that from the root is most active. Bark stronger, if collected from the root in autumn. Deteriorates by keeping. Tonic, sedative, expectorant. Infusion officinal. Thus made: bark bruised, half an ounce; one pint water (cold). Macerate for twenty-four hours. Dose, two or three fluidounces three or four times a day. Syrup officinal: Take of wild cherry bark, in coarse powder, five ounces; sugar, refined, two pounds, water, sufficient to moisten the bark thoroughly. Let it stand for twenty-four hours in a close vessel; then transfer it to a percolator, and pour cold water upon it

gradually until a pint of filtered liquor is obtained. To this add the sugar, in a bottle, and agitate occasionally until it is dissolved. Dose, one-half fluidounce. By Proctor's analysis, it contains starch, resin, tannin, gallic acid, fatty matter, lignin, salts of lime, potassa, and iron, and a volatile oil associated with hydrocyanic acid. This proved fatal to a cat in less than five minutes. See Journal Phil. Coll. Pharm. vi, 8; Am. Journal Pharm. x, 197. The leaves, also, are sedative and antispasmodic: used in coughs, angina pectoris, etc. The dose of the powdered root is from twenty grains to one drachm. The infusion is the most convenient form. A syrup is also made; beside several secret preparations.

Method of making "*Cherry*" *cordial* by the Southern matrons in the lower country of South Carolina (Saint John's)—a most delectable drink at all times, but particularly valuable in the present emergency: Fill the vessel with cherries (not washed, if gathered clean.) Cover with whisky. After several weeks pour off all the clear liquor and press the cherries through a sieve. Put into the juice thus pressed out five pints of brown sugar, and boil with syrup enough to sweeten the whole demijohn. Pour five pints of water on the thick part; boil and strain to make the syrup with the sugar. "Blackberry cordial" is made in the same way; or it can be stewed, strained, sweetened, and whiskey added. In the above, the sugar is to be boiled in the water which is obtained from the thick part, as directed. ("I. S. P")

The wood of this tree is highly valuable, being compact, fine grained, and brilliant, and not liable to warp when perfectly seasoned. When chosen near the ramifications of the trunk, it rivals mahogany in the beauty of its curls. Farmer's Encyc.

Cerasus Carolinana, Mich. } Wild orange; Fl.
Prunus " L. Ell. Sk. } March.

This is one of the most ornamental of our indigenous evergreen trees; and is planted around dwelling-houses.

The berries, bark, and leaves possess in a high degree the taste characterizing the genus. It deserves an analysis.

This tree, the flowers of which are much frequented by bees, grows abundantly on the sea-coast of our states, and is certainly one of the most beautiful and manageable evergreens that we possess. It can be cut into any shape, and is of a most attractive green color. It forms an impervious hedge, and grows rapidly. The black, oval berries contain an abundance of Prussic acid, as does the whole tree; but I do not know of any use to which it is applied. Dr. Thompson has found great use from Prussic acid, largely diluted, as a local application in impetigo. He used the infusions of bayberry; no doubt the infusions of the wild orange would be equally useful. In the Patent Office Reports, Agriculture, 1854, '55, p. 376, are papers on "Live fences," or the planting and management of quick-set hedges. In this the reader will find a most full and satisfactory account of the desirable plants for hedges, both American and European. This is not the place for a full description of these plants and shrubs; but I will at any rate give a list of some of them, and refer the reader to the article. All are of course not adapted to our climate. The English *sloe*, or black thorn (*Prunus spinosa*), the hawthorn (*Cratægus oxyacantha*), and the buckthorn (*Rhamnus catharticus*) have been planted in this country with indifferent success on account of the intense heat of our southern sun. "The 'Washington Thorn' (*C. cordata*), growing in mountains of Georgia, was also brought into notice as a hedge plant toward the close of the last century, and was subsequently employed for that purpose in various sections of the Union; but owing to improper management, and the tendency to disarm itself of its spines after a certain age, it has been discontinued. Similar results have attended the adoption of other species of thorny trees and shrubs in this country, with the exception of the 'Osage orange,' the 'Spanish bayonet' (*Yucca*), and the 'Cherokee rose.'" These are natives of this continent. See "Osage Orange." See article for modes of management, planting, etc., of

hedges, with illustrations on wood. The *arbor vitæ* (*Thuja occidentalis*), one of our native plants, growing only in the highest mountains, is said to be "indigenous, and to grow abundantly on the banks of the Hudson, making the finest ornamental hedge known to this climate." The holly (*Ilex opaca*) and the hemlock spruce (*Abies canadensis*) should be mentioned; also the willow box (*Buxus sempervirens*); prickly ash (*Xanthoxylum fraxineuma*); honey locust (*Gleditschia triacanthus*)—all these are either natives or are cultivated in the Confederate States. See Willow and Osage Orange.

Amygdalus. The peach produces abundantly in the Confederate States. The root, leaves, and kernels are sometimes employed in medicine, and in seasoning drinks, condiments, etc.—being indebted for any virtues which they possess to the hydrocyanic acid contained in them. A tea of the leaves is a favorite domestic palliative in whooping-cough, and in most pectoral affections. A tea made with either the bark, leaves, or flowers, will act freely as a purge. Dose for a child, a teaspoonful repeated every half hour till it operates. A syrup may be made by adding honey. The gum of peach or pear dissolved in water acts like gum arabic. The kernel is used in seasoning, and in making the cordial known as ratifia; also in adding to tonics. The leaves are used in seasoning creams in imitation of vanilla bean. Leaves put in layers with cotton, and boiling water poured over, will dye yellow. The cotton or thread should first be boiled in a solution of alum. The leaves of artichoke (*Cynara*) also dye a yellow color: see "*Rhus.*" Sassafras roots with copperas yield a drab. Fumigation with tobacco smoke, syringing with tobacco water, and washing with strong lime water are requisite for destroying aphides whenever these exist in such swarms as to make a copious discharge of honey dew. See Wilson's Rural Cyclopædia, Art. *Aphis.*

Drying Peaches. Several modes of effecting this are pursued. When done in-doors, furnaces should be placed in

the cellar, from which the heated air may rise into the building suitably provided with shelves, etc.

In some of the Southern states, says Mr. Kenrick, the process is facilitated by a previous scalding. This is effected by immersing baskets of the fruit a few minutes in kettles of boiling water. They are afterward halved, the stones separated, and being laid with the skins downward, the drying is effected in the sun in three days of good weather. They then may be stored in boxes.

In France, as we are informed, peaches and other fruits are thus dried whole. The peaches or other fruits, being pared, are boiled for a few minutes in a syrup consisting of one pound of sugar dissolved in three quarts of water, and after being drained, by being laid singly on board-dishes, they are placed in the oven after the bread is taken out, and when sufficiently dry they are packed in boxes. The following is the mode of drying practised by Mr. Thomas Bellangee, of Egg Harbor, New Jersey: He has a small house provided with a stove, and drawers in the sides of the house lathed at their bottoms, with void intervals. The peaches should be ripe, and cut in two, not peeled, and laid in a single layer on the laths, with their skins downward, to save the juice. On shoving in the drawer, they are soon dried by the hot air produced by the stove. In this way great quantities may successively, in a single season, be prepared, with a very little expense in the preparation of the building and in fuel.

Shepardia magnoides, N. Buffalo-berry tree. Mo. Nuttall. I do not know the family of the plant.

The fruit, resembling currants of a fine scarlet color, and growing in clusters, have a rich taste, and are considered valuable for making into tarts and preserves. Farmer's Encyclopædia.

Leguminosæ, or Fabaceæ. (*The Bean Tribe.*)

The sub-orders are distinguished by nutritive, purgative, and astringent properties.

Cladrastis tinctoria. Raf. (*Virgilia lutea* Mx.) Yellow-wood. Hill sides Tennessee and Kentucky.

The wood is yellow, and dyes a beautiful saffron color.

Piscidia erythrina, L. Jamaica dogwood. South Florida. Chap.

The piscidia is said to be used in America for stupefying fish, which are taken as readily by this means as with *nux vomica.* Wilson's Rural Cyclopædia.

Baptisia tinctoria, Ell. Sk. Wild indigo. Grows in rich, shaded lands; vicinity of Charleston; collected in St. John's; Newbern. Fl. July.

Barton's Med. Bot. ii, 57; Lind. Nat. Syst. Bot. 153. Its virtues reside in the cortical part of the root. In large doses, it operates violently as an emetic, cathartic, and sub-astringent antiseptic. It is said to have proved useful in scarlatina, typhus fever, and the condition attendant upon mortification and gangrene. Dr. Comstock found it useful in the latter state, used both externally and internally. Eclectic Repert. vi; U S. Disp. 1231. It was employed by Dr. C. not only in existing, but as a prophylactic in threatened mortification and gangrene. Dr. Thacher speaks highly of its efficacy as an external application to obstinate and painful ulcers, and Eberle (Diseases of Children, p. 98) used a decoction with advantage in the aggravated cases of ulcerated umbilicus, so frequently met with in infants. It may be employed topically, in the form of a cataplasm. The young shoots may be eaten as asparagus; but after they assume a green color, they act as a drastic purgative. Griffith, Med. Bot. 232. The decoction, made with one ounce of the recent root to one pint of boiling water, is given in doses of a tablespoonful every three or four hours. The ointment, prepared by simmering the fresh root in lard, is applied to ulcers and burns.

B. leucophæa, Nutt. } Grows in dry soils; found in
bracteata, Muhl. Cat. } Georgia also. Fl. April.

Sent to me from Abbeville district, by Mr. Reed, by whom

I am informed that a decoction of the leaves and branches is considered stimulant and astringent, and was used by Dr. Branch, of that district, with great satisfaction in all cases of mercurial salivation.

Medicago lupulina, L. Yellow clover; lucern; nonesuch. Introduced. Waste places Florida, and westward.

It has been planted extensively as a clover, but is not so valuable as other species—the *M. sativa*, for example. See Wilson's Rural Cyclopædia for long article on "Clover," and "Lucern."

Melilotus officinalis, Ph. Melilot; sweet clover. Completely nat. says Elliott, around Charleston.

Dém. Élém. de Bot. iii, 37 The infusion of the flowers is emollient and anodyne, and is employed in inflammation of the intestines, retention of urine, tympanites, etc. Am. Herbal, 222; U. S. Disp. 1275. It is thought to be possessed of very little efficacy in medicine, but is used as a local application, in the form of decoction or cataplasm, in inflammatory diseases. Lind. Nat. Syst. Bot. 153; Journal de Pharm. xxi, 152. A principle called *coumarin* exists abundantly in the flowers of the melilotus, and it possesses an odor which is attributed to the presence of benzoic acid. See Vogel's Anal. Nouv. Journal de Méd. viii, 270; Mér. and de L. Dict. de M. Méd. iv, 293; Flore Med. iv, 229; Aublet, Voyage, ii, 454; Haller, Hist. Stirp. Helv. 362. The flowers are employed in flatulent colic, and in rheumatism, and the decoction for fomentations. Several species of it are used to flavor Chapziger cheese. Wilson states that it is used in making the famous Gruyère, or Schabzieger cheese, and is the cause of its peculiar flavor —the flower and the seeds in a dried state being bruised or ground, and mixed with the curd before pressing. Any mixture of the seeds with bread corn renders the latter very disagreeable. Melilot, Wilson adds, was long used in making a blister plaster which bore its name, and acquired from it a green color and a disgusting smell, and was of exceedingly little value. Rural Cyc.

Trifolium pratense, L. Red clover. Vicinity of Charleston; Newbern.

Dém. Élém. de Bot. ii, 36. All the species contain a mucous, nutritive principle. In Ireland, when food is scarce, the powdered flowers are mixed with bread, and are esteemed wholesome and nutritious. Fl. Scotica, of Lightfoot. Some are said to produce vertigo and tympanites in cattle which feed on them.

Trifolium arvense, Linn. Rabbit-foot; field clover.—"Grows sparingly in the upper districts." Collected in St. John's; Charleston district; Newbern. Fl. April.

Wade's Pl. Rariores, 56. Dickerson observes that the dried plant is highly aromatic, and retains its odor. It has been used in dysentery. Withering, 636; Fl. Scotica, 406.

Trifolium reflexum. Wild buffalo clover. Upper districts; vicinity of Charleston; collected in St. John's.

It affects very sensibly the salivary glands. In horses, this may frequently be noticed.

Trifolium repens, L. White clover. Vicinity of Charleston; collected in St. John's; Newbern. Fl. May.

Ell. Bot. ii, 201. This also affects the salivary glands, sometimes producing complete salivation. Fl. Scotica, 404. Its leaves are a good rustic hygrometer, as they are always relaxed and flaccid in dry weather, but erect in moist and rainy.

Astragalus. Milk-vetch.

There are five species of this genus within our limits. I refer to them because the seeds of *A. boeticus*, planted in Germany and England, are found to be the very best substitute for coffee yet tried, and so used—roasted, parched, and mixed with coffee. Our species of *Vicia*, tare, vetch, and *Lathyrus* should also be tried.

Psoralea esculenta. Edible psoralea.

The bread root, growing in Missouri, is eaten by the

inhabitants of the plain, and the Rocky mountains. Rural Cyclopædia.

Indigofera Caroliniana. Walt. Grows in dry soils; vicinity of Charleston; collected in St. John's, Berkley; Newbern. Fl. May.

Not inferior, says Nuttall, to the cultivated indigo. It does not, however, possess so much coloring matter. The decoction of the leaves is said to act as an emetic when given in large quantities; in smaller doses it is cathartic. "F I. S." a correspondent of the Charleston Mercury, says: "Our country ladies gather *wild indigo*, and ferment from it a blue powder equal to the commercial indigo, which dyes a beautiful and lasting blue. A solution of this powder in water is a speedy and certain relief for cramp and asthma. The *red sumach* dyes a rich dark or light purple, as is required."

Indigofera tinctoria. Indigo. Once cultivated in South Carolina to a large extent; see *Indigofera anil.* Collected in St. John's, Berkley. Fl. June.

Drayton's View of South Carolina. Mérat and de L. Dict. de M. Méd. iii, 601. According to Laennec, the decoction of the root possesses the property of action against poison, and is useful in nephritic diseases. In Jamaica, it is employed to destroy vermin. The leaves are alterative, and are given in hepatic disorders. Ainslie, Mat. Med. Ind. i, 180; ii, 33; Journal de Botanique, v, 11; Ann. de Chim. lxviii, 284; M. and de L. Supplèm. 1846, 383; Martius, Syst. Mat. Med. 126; Perollet, Mém. sur la culture des indigofères tinctoriaux, Paris, 1832; L'Herminier, Résumé des obs. faites sur plusieurs espèces indigofères de Guadeloupe: see Journal de Pharm. xix, 257; A. Saint Hiliare, "Hist. Indigo, from the first account of it till the year 1833" (Ann. des Sci. Nat. vii, 110); Mem. on Indigo, in the Comptes Rendus Hebdom. of Acad. Nat. Sci. 19th Dec. 1836, 445; Dumas' Mem. upon Indigo, its Composition, etc., in the Journal de Chim. Méd. iii, 66, 1837; D. Erd-

mann, Rech. upon Indigo (in French, also), in the 26th vol. Journal de Pharm. 460, 1840; and the report upon the proposed extraction of indigo from the *Polygonum tinctorium.* See Journal de Pharm. xxxvi, 274. The remains of the indigo plantations, with the vats in which indigo was prepared, are still to be seen in the lower districts of South Carolina, bordering on the Santee river. Since the introduction of cotton and rice it is cultivated, though not very largely.

On the cultivation, preparation, etc., of indigo, *Woad* (*Isatis tinctoria*), see Chaptal's Chemistry applied to Agriculture, p. 295; Ure's Dictionary of Arts, Manufactures, and Mines, articles "Indigo," "Calico Printing;" also, Penny Cyclopædia. I must content myself simply with a reference to the source of information. The *I. anil* is also used for the production of indigo. The So. Cultivator, vol. ii, p. 58, contains a full account of the preparation of indigo. To avoid the deleterious effects of fermented indigo, Dr Roxburg, of India, states that he succeeds perfectly by the "scalding process." This is doubted. See also, Southern Cultivator, p. 15, vol. 6, report of a Committee of Georgia Agricultural Association. They recommend the *Indigofera argentea*, or wild indigo of Georgia. I insert the following:

"The directions for preparing I obtained, many years ago, from an old and respectable planter in South Carolina. The manuscript which he delivered to me was from the pen of one who had been extensively engaged in the cultivation and preparation of indigo for market, before the Revolution. It has never been published; and may, therefore, impart information on a process little known by the present generation.

"The pigment, or dyeing substance of the indigo, is obtained from the leaves. There are several species of this plant. The *Indigofera tinctoria*, or French indigo, yields the greatest quantity, and is cultivated in India; but the quality is inferior to the *Indigofera argentea*, or wild indigo. The former is distinguished by its pinnate leaves, the

smaller ribs expanding from the principal rib like the feathers of a quill, similar to the leaves of the pear and of the lime-tree, and by a more slender, ligneous stem. It rises, in a rich soil, and when well cultivated, to the height of six feet.

"The seeds are sown as early in the spring as the climate and season will warrant. In the West Indies, the planting commences in March, in trenches about a foot asunder; and the weed is cut down in May. In South America, six months elapse before it can be cut. In the former, generally four cuttings are obtained of the same plant in the course of a year; but in the latter, never more than two, and often only one. The cutting takes place when the plant is in blossom, and is done with the sickle. Fresh plantings of the seed are required yearly.

"Commence the cutting of the weed in the evening, in time to have the steeper set before it is dark. The plants are laid in strata, and pressed down by weights. When a sufficient quantity of them are laid, pour in water to the height of about four inches above them. One inch and a half above the surface of the water bore a hole through the side of the vat, and directly over the trough which is to convey the liquor into the beater. When the fermentation has commenced the liquor will rise and run over. Let it remain until the stream has ceased, or nearly so. This, in hot weather, will be from ten to fourteen hours after the water has been poured upon the weed, or on the following morning. *Immediately* draw off into the beater, and commence the agitation. Continue this for about twenty minutes, and then let in the lime-water until you have plenty of grain, but not very coarse. The agitation must be carried on, and frequent use be made of the plate. As soon as a change in the color is perceived, from a muddy green to a purple or blue, the beating should cease. This operation usually requires an hour. There can be no certain rule as to the quantity of lime-water to be used, or the length of time for continuing the agitation. If the indigo be not sufficiently steeped, it will require more lime-

water, and longer beating, and *vice versa.* Having obtained the fine blue tint you wish, stop the agitation, and pour in an additional quantity of lime-water, which will cause the grains to collect and settle in a short time. Be careful, however, not to add so much as to give the liquor a yellow or red tinge: it should be of a clear, but pale green. As the sediment subsides, commence drawing off the water through the upper plugs, and so on to each successively, until the mud alone remains at the bottom of the vat or beater. In the evening this should be removed into the drainer, and by the morning following it will be well drained and cracked, which it should be before it is taken out. Having first pressed out the water remaining in it, work up the mud; give it a second pressure, and work it up again until it becomes stiff. After this, submit it to a third pressure, for cutting. Should your indigo incline to mould on the drying-boards, as it is apt to do in rainy or damp weather, the mould must be wiped off; otherwise it may turn to a gray color. Let it remain upon the drying-boards until you plainly see the quality; afterward it may be put up in small barrels. In continued damp weather, during the manipulating and drying process, put the greenish indigo in the sun, and turn it frequently. As soon as it begins to crack, take it in.

"Good indigo is known by its lightness, or small specific gravity, indicating the absence of earthy impurities; by the mass not readily parting with its coloring matter, when tested by drawing a streak with it over a white surface: but above all, by the purity of the color itself. The first quality, estimated by this last test, is called, in commercial language, *fine blue;* the next, *ordinary blue*, then *fine purple*, etc. The most inferior is known as *ordinary copper.*"

The most satisfactory information can be got in the Patent Office Reports, and from Mr. Spalding, Liebig, Chaptal, Encyclopædia, etc., etc. Several varieties are cultivated. The *Indigofera disperma* is used in Guatemala, and makes the best and most beautiful article. The *Indigofera tinctoria*, formerly cultivated in South Carolina and Georgia, is the

most productive, and the increase in quantity will make up the deficiency in price.

Culture and Manufacture of Indigo (signed 'Oconee').— "The soils best adapted to it are the rich, sandy loams, though it grows on most lands moderately well, provided they are not wet. The ground should be well broken, and kept light and free from grass by the plow. The nature of the manure used exerts a great influence upon the quantity and quality of its coloring principle. Those substances that act as stimulants to vegetation, such as lime, poudrette, ashes, etc., etc., favor the growth of the plant without injuring the coloring matter. When barn-yard manure has been largely used, a crop of grain should first be raised on the land.

"The seed should be mixed with ashes or sand, and sown in drills fourteen inches apart, four quarts of seed to the acre. In this climate (Middle Georgia), the seed should be sown the first of April. When it first comes up it should have the grass picked out with the hand. When an inch or two high the grass between the rows should be cut out with the hoe or scraper, and the soil loosened about the roots. Three weedings are enough before the first cutting, which should commence as soon as the plant throws out its bloom. It is so easily injured by the sun after being cut, that the operation should be commenced and end in the afternoon. After cutting with the reap-hook, it is put under the shed until it can be put in the vats. In Georgia, the two cuttings yielded sixty pounds of indigo to an acre, provided the roots were not injured in the first cutting, which at three acres to the hand would be one hundred and eighty pounds ($180). The price varies from 30 cents to $2.25 per pound for the best Guatemala.

"Like other plants, it has its enemies. The leaves are frequently seen covered with yellow spots, owing to some change in the atmosphere. It often happens that in consequence of a degree of heat and drought, the plant is not fully developed; the leaves are not more than one-third

their proper size, yet exhibit all the properties of a perfect plant. If the plant is cut in this imperfect state the crop is lost, for the indigo is not well developed. An insect (the flea) often destroys the first crop of leaves. Next, a louse destroys the plant later in the season ; this, however, is not so bad as the first. The cutworm also commits some depredations upon it.

"*Manufacturing Process.*—Two methods are used, the cold and the hot. The cold is the safest; the plant must be in a certain state to use the hot.

"1st. *By Cold Water.*—The weed is put in the vat and covered with clear water, where it remains until the color of the liquid becomes a light olive; this is about ten hours; the weed must be pressed down by heavy scantling laid upon it. Draw the liquid off into the churn or beater. The churning must now be commenced, and kept up until the fluid becomes lighter in its general shade, and the blue fecula are seen in the water; which sooner begins from small quantities of lime-water being added from time to time during the process of beating. The quantity of lime-water that is used should be not more than one-tenth of the liquid that is in the vat. If the lime-water be all thrown in at once, the lime more than saturates the carbonic acid, and the carbonate thus formed will be precipitated, and thus injure the indigo. After the fecula shows itself distinctly in the water, the vat is allowed to be still for four or five hours, then the clear water is drawn off by faucets at different heights, so as to allow the indigo to be precipitated in the bottom.

"2d. *The Hot Process.*—The weed is put in the vat, boling water is let on so as to saturate the plant, and fully cover it. The weed is kept down by scantling thrown upon it. Allow the water to stand from five to fifteen minutes, according to the effect above mentioned. Draw it off through a faucet and sieve into the beater; repeat until all the coloring matter is extracted; beat or churn as above, omitting the lime-water; remainder of the process the same.

"The precipitated indigo still requires some farther operations to bring it to a state of perfection (though it can be dried and sent to the market as it now is). It contains particles that are imperfectly oxydated; consequently it has neither the color nor properties of the best indigo. Continued beating would bring these to a proper state; but it would cause the particles first oxydated to imbibe an additional quantity of oxygen, by which the color is too much deepened, and the article would be rejected in commerce as *burnt*. To avoid this, throw over the liquid fecula a volume of warm water double the quantity of the fecula, stirring it all the while; by this means the perfect indigo will be precipitated, the other held in suspension. This water is drawn off, and lime added, etc., as above, by which the green color becomes a yellow brown, and the indigo is rendered insoluble and precipitated. That indigo may be pure and brilliant, it should be twice washed—once in cold, and once in hot water. After washing, allow the fecula to settle, then draw off the water.

"The last purification now is to mix the fecula with another quantity of water, in a vat having several faucets. While it is suspended, the earths are precipitated; draw off while stirring, and allow to settle. The last operation consists in putting the fecula in a coarse bag of hemp or wool, and this bag in an open basket to drain, placing weights upon it until it becomes tightly compressed. These last operations are not requisite if a very common article is to be made; but it is well to follow all the purifications. The increase in price will cover the increase of trouble."

"*Indigo Vat.—Description.*—For every set of ten hands there should be what are called a set of works. These formerly cost about one hundred dollars or more, and were a vat or tank, made of plank two inches thick, well joined. This vat is twenty feet square, stands upon posts four feet from the ground, and is kept tight by wedges driven into the sleepers upon which the plank rests. The vat is three feet deep, and is called the steeper. Along-side of it is

another vat, twenty feet by ten, occupying the space between the bottom of the steeper and the ground, into which the water is drawn in which the indigo is steeped when ready to be beat, or churned, as we may say. At the end of this last vat a small tank or cask must be placed, to furnish lime-water in the process of beating. The liquor is drawn from the steeper by a spigot at the bottom of the vat along the beater. Lengthwise of this is stretched a beam, resting on its upper ends, and revolving on journals, and furnished with cross arms, to the ends of which are fixed open buckets without bottoms, containing about two gallons each. Two men, standing on this beam, with a handspike fixed to the long beam, alternately plunge the open buckets right and left, thus churning the liquid until it begins to show a blue fecula, which is produced by small quantities drawn from the lime cask."

Method successfully used by a negro (Geoffrey) on a plantation (Mrs. J. S. P.), St. John's, Berkley, South Carolina, to prepare a dye from the wild indigo:

Cut the plant, put in a barrel, and cover with water. In about three days it commences to foam, and it is then ready to *churn;* take out the leaves, and press the liquid out of them. It is then to be whipped up in a churn with a stick made like a dasher. When it foams, a greased feather applied to the surface will check the foam. In order to test whether the process is sufficiently advanced and the blue color extracted, it may be tested in a white plate put in the sunlight; the thickened grounds will be visible. About a quart of strong lye-water, or lime soaked in water, should be first thrown in to *settle* it. This should be done before it is churned. If the coloring substance appears to be sufficiently separated by the test mentioned above, drain the supernatant water carefully away. The remainder, or sediment, should be placed in a bag to drain. This contains the indigo. This indigo may subsequently be moulded into cakes. I have seen yarn excellently dyed by it; also wool, which was dyed before it was carded, and made into cloth (1862).

The following process of manufacturing indigo in small quantities for family use is extracted from the Southern Agriculturist:

Cut the indigo when the under leaves begin to dry, and while the dew is on them in the morning; put them in a barrel, and fill this with rain water, and place weights on to keep it under water; when bubbles begin to form on the top, and the water begins to look of a reddish color, it is soaked enough, and must be taken out, taking care to wring and squeeze the leaves well, so as to obtain all the strength of the plant; it must then be churned (which may be done by means of a tolerably open basket, with a handle to raise it up and down) until the liquor is quite in a foam. To ascertain whether it is done enough, take out a spoonful in a plate, and put a small quantity of *very strong lye* to it. If it curdles, the indigo is churned enough, and you must proceed to break the liquor in the barrel in the same way, by putting in lye (which must be as strong as possible) by small quantities, and continuing to churn until it is all sufficiently curdled; care must be taken not to put in too much lye, as that will spoil it. When it curdles freely with the lye it must be sprinkled well over the top with oil, which immediately causes the foam to subside, after which it must stand till the indigo settles to the bottom of the barrel. This may be discovered by the appearance of the water, which must be let off gradually by boring holes first near the top, and afterward lower, as it continues to settle; when the water is all let off, and nothing remains but the mud, take that and put it in a bag (flannel is the best), and hang it up to drip, afterward spreading it to dry on large dishes. Take care that none of the foam, which is the strength of the weed, escapes; but if it rises too high, sprinkle oil on it.

Seven or eight species of indigo are found in the United States, most of which are in the South. The wild indigo (*Dyer's baptisia*), common in Pennsylvania and other Middle states, yields a considerable proportion of blue coloring matter of an inferior kind. (*Flora Cestrica.*)

Blue Dyes.—The materials employed for this purpose are indigo, Prussian blue, logwood, bilberry (*Vaccinium myrtillus*), elder-berries (*Sambacus nigra*), mulberries, privet-berries (*Ligustrum vulgare*), and some other berries whose juice becomes blue by the addition of a small portion of alkali, or of the salts of copper. I shall here describe the other, or minor blue dyes: To dye blue with such berries as the above, we boil one pound of them in water, adding one ounce of alum, of copperas, and of blue vitriol to the decoction, or in their stead equal parts of verdigris and tartar, and pass the stuffs a sufficient time through the liquor. When an iron mordant alone is employed, a steel-blue tint is obtained; and when a tin one, a blue with a violet cast. The privet-berries, which have been employed as sap colors by the card-painters, may be extensively used in the dyeing of silk. The berries of the African night-shade (*Solanum guineense*) have been of late years considerably applied to silk on the continent in producing various shades of blue, violet, red, brown, etc., but particularly violet.

Glyceria tomentosa. Grows in dry pine lands. Fl. June. Mér. and de L. Dict. de M. Méd. 387 In Pondicherry, this is given to horses in place of oats. Mém. du Muséum, vi, 326.

Tephrosia Virginiana, Ph. Turkey pea; goat's-rue. Vicinity of Charleston; grows in dry soils. Fl. July.

Lindley's Med. Flora, 244; Griffith, Med. Bot. 238. The roots were used by Indians, and are now employed in popular practice as a vermifuge; a decoction is said to act as powerfully and as efficiently as the pink root (*Spigelia*). Attention is invited to it.

Amorpha fruticosa, L. Bastard indigo. Florida, Carolina, and Mississippi.

This was formerly used in Carolina as an indigo plant, and continues to be extensively cultivated in Britain as an ornamental shrub. Wilson's Rural Cyclopædia.

Robinia pseudacacia, L. Yellow locust tree; locust; false acacia. Grows in the mountains of South Carolina; vicinity of Charleston; collected in lower St. John's, Berkley, near Ward's plantation, Mrs. Prioleau's; Newbern. Fl. May.

Dém. Élém. de Bot. The flowers are aromatic and emollient. An antispasmodic syrup is prepared from them; and Gendrin states that when given to infants it produces sleep, vomiting, and sometimes slight convulsive movements; he relates a case where it was swallowed by boys, in whom acro-narcotic effects were induced. Mér. and de L. Dict. de M. Méd. vi, 101; Desfont, Traité des Arbres, ii, 304; Ann. d'Hort. ix, 168; Ann. Clin. de Mont. xxiv, 68. The inner bark is fibrous, and may be spun into cordage; the wood is of a fine, compact grain, and is used for manufacturing purposes. Mém. sur la Robinia, Mém. de la Soc. d'Agricult. 1786; François, Letters on the Robinia, Paris, 1803. Griffith, in his Med. Bot. 239, says that it has not received sufficient attention, for "every part is endowed with some good quality." On account of its durability, the wood is much used for treenails in ship-building; the leaves, prepared in the same manner as those of the indigo, may be employed as a substitute: they afford an excellent nourishment for cattle, either in the fresh or in the dried state. Willich, Domestic Encyc. i, x. Grossier (Desc. de la Chine) says that they are used by the Chinese to produce the beautiful yellow color so remarkable in their silks. It is prepared by roasting half a pound of the half expanded flowers in a copper pan over a gentle fire, and stirring them continually; after turning yellow, water is poured over, and it is boiled till it acquires a deep color. It is then strained, and half an ounce of alum, and the same quantity of shell lime are added, when the dye is fit for use. It is possible that this author may have confounded this plant with the *R. flava*. Mérat says the flowers furnish a palatable dish when fried. The seeds are somewhat acrid, but afford a large quantity of oil on expression. By infusion in water, they become perfectly mild, and contain an excellent farina.

This tree, both the leaves and flowers of which are beautiful, has attracted great attention in England, and its seeds are largely imported, to be planted as a hedge and ornamental plant, and for various purposes. Almost a mania prevailed upon the subject. "No other tree grows more rapidly than this, excepting some species of the willow and the poplar." A sucker at Chiswick grew twenty feet in one season, with a circumference of three inches. When the tree is felled suckers spring from the trunk in great profusion.

Large quantities are exported to Liverpool for fastening bolts in ship-building. C. W Johnson and others write of it thus: "The wheelwright and the coach-builder have employed it for axle-trees of carriages; the turner has used it for various purposes of his art, and has been delighted with its smooth texture, and beautifully delicate straw color; fence-makers have used it for rail fencing, and have found it to stand wet and dry near the ground better than any other timber in common use, and to be as durable as cedar; landscape gardeners have planted it for a combination of ornament and utility. * * Farmers might try it for the formation of hedges, and were they to transplant it from the nursery when it has a height of about four feet, they would find it forming a hedge quite equal in compactness, strength, economy, and manageableness, to hedges consisting of tried and approved plants, and a hedge available as a fence far earlier than any other, and capable of being raised to any desirable elevation. The flowers of the acacia tree are used in St. Domingo for making a distilled liquor, and its roots, and leaves, and juices contain a considerable proportion of sugar." Wilson's Encyc. Rural. The plants are easily propagated by pouring boiling water over the beans in the fall; let them remain twenty-four hours, and plant. They grow six or seven feet the first season.

Robinia hispida; also *Va. rosea.* Rose acacia. Mountains of Georgia and North Carolina. Chapman.

Wilson speaks of it as a "remarkably beautiful shrub."

Its shoots of each year, or newest and freshest twigs, carry the flowers; so that its old wood may be annually pruned away to any extent which the taste of the cultivator or the situation of the plants may require. The flowers are large, odorless, and of a beautiful rose color. See, also, nearly all the English and Scotch authorities.

The following highly interesting account of this tree, and the mode of cultivating it in the United States, is given by Dr. S. Ackerly:

"The cultivation of the locust tree on Long Island, and in other parts of the State of New York, has been attended to with considerable profit to the agricultural interest, but not with that earnestness which the importance of the subject demands. This may have arisen from the difficulty of propagating it by transplanting, or not understanding how to raise it from the seed.

* * * * * * *

"The locust is a tree of quick growth, the wood of which is hard, durable, and principally used in ship-building. To a country situated like the United States, with an extensive line of sea-coast, penetrated by numerous bays, and giving rise to many great rivers, whose banks are covered with forests of extraordinary growth, whose soil is fertile, rich, and variegated, and whose climate is agreeably diversified by a gradation of temperature; to such a country, inhabited by an industrious and enterprising people, commerce, both foreign and domestic, must constitute one of the principal employments. As long as the country possesses the necessary timber for ship-building, and the other advantages which our situation affords, the government will continue to be formidable to all other powers. We have within ourselves four materials necessary for the completion of strong and durable naval structures. These are the *live-oak, locust, cedar, and pine,* which can be abundantly supplied. The former is best for the lower timbers of a ship, while the locust and cedar form the upper-works of the frame. The pine supplies the timber for decks, masts, and spars. A vessel built of live-oak, locust, and cedar, will last longer

than if constructed of any other wood. Naval architecture has arrived in this place, and other parts of the United States, to as great perfection, perhaps, as in any other country on the globe. Our 'fir-built frigates' have been compared with the British oak, and stood the test; and in sailing, nothing has equalled the fleetness of some of our sharp vessels. The preservation and cultivation of these necessary articles in ship-building is a matter of serious consideration. It might not be amiss to suggest to the Congress of the United States to prohibit the exportation of them. The pine forests appear almost inexhaustible, and they will be so in all probability for many generations to come; but the stately cedars of Mobile, and the lofty forests of Georgia, where the live-oak is of a sturdy growth, begin to disappear before the axe of the woodsman. The locust, a native of Virginia and Maryland, is in such demand for foreign and domestic consumption that it is called for before it can attain its full growth. It has been cultivated as far eastward as Rhode Island, but begins to depreciate in quality in that state. Insects attack it there, which are not so plentifully found in this state, nor its native situations. These give the timber a worm-eaten appearance, and render it less useful. The locust has been extensively cultivated in the southern parts of the State of New York, but the call for it has been so great that few trees have attained any size before they were wanted for use. Hence they are in great demand, and of ready sale, and no ground can be appropriated for any kind of timber with so much advantage as locust. Beside its application to ship-building, it is extensively used for fencing; and for posts, no timber will last longer, in or out of the ground. On Long Island, where wood is scarce and fencing timber in great demand, the locust becomes of much local importance from this circumstance alone, independent of its great consumption in this city among ship-builders. In naval structures it is not exclusively applied to the interior or frame. In many places where strength is wanting, locust timber will bear a strain which would break oak of the

same size. Thus an oak tiller has been known to break near the head of the rudder in a gale of wind, which has never happened with a locust one. Tillers for large sea vessels are now uniformly made of locust in New York. It is the best timber also for pins or treenails (commonly called trunnels), and preferable to the best of oak. The tree generally grows straight, with few or no large limbs, and the fibres of the wood are straight and parallel, which makes it split well for making treenails, with little or no loss of substance. These are made in considerable quantities for exportation.

"The locust tree does not bear transplanting well in this part of our country, but this in all probability arises from the custom of cutting off the roots when taken up for that purpose. Most of the roots of the locust are long, cylindrical, and run horizontally not far under the surface. In transplanting, so few of the roots are left to the body of the tree removed that little or no support is given to the top, and it consequently dies. If care was taken not to destroy so much of the roots a much larger proportion of those transplanted would live and thrive. So great has been the difficulty in raising the locust in this way that another method of propagating it has been generally resorted to. Whenever a large tree was cut down for use, the ground for some distance around was ploughed, by which operation the roots near the surface were broken and forced up. From these roots suckers would shoot up, and the ground soon become covered with a grove of young trees. These, if protected from cattle by being fenced in, would grow most rapidly, and the roots continuing to extend, new shoots would arise, and in the course of a few years a thrifty young forest of locust trees be produced. The leaves of the locust are so agreeable to horses and cattle that the young trees must be protected from their approach. When growing in groves they shoot up straight and slender, as if striving to out-top each other, to receive the most benefit from the rays of a genial sun.

"Another difficulty has arisen in propagating the locust,

from inability to raise it from the seed. The seed does not always come to perfection in this part of the State of New York, and if it does, it will not sprout, unless prepared before planting. The method best adapted to this purpose was proposed by Dr. Samuel Bard; but it is not generally known, or if known, is not usually attended to. When this shall be well understood and practised, the locust will be easily propagated, and then, instead of raising groves of them, the waste ground along fences, and places where the Lombardy poplar encumbers the earth will be selected to transplant them, as by having them separated and single there will be an economy in using the soil, the trees will grow much better, and the timber be stronger.

"Dr. Bard's method of preparing the seeds was to pour boiling water on them, and let it stand and cool. The hard, outer coat would thus be softened, and if the seed swelled by this operation, it might be planted, and would soon come up."

Robinia viscosa, Vent. Clammy locust. Grows among the mountains, and in Georgia. Fl. May.

Mér. and de L. Dict. de M. Méd. vi, 101. The young branches afford an abundant, glossy exudation, secreted by little superficial glands, which is dissolved by ether; Vauquelin considers it a peculiar product: An. de Chim. xxvii, 223. Chevalier, however, doubts it: Dict. des Drogues, iii, 15.

Rhyncosia tomentosa (?). Dollar-plant. Diffused in dry pine lands.

This plant, receiving its name probably from the shape of the leaf, is reputed, in the neighborhood of Aiken, S. C., and elsewhere, to be a valuable agent in arresting troublesome diarrhœa. A tea is given several times a day. Several cases have come to my knowledge where it was successfully employed—no doubt on account of tannin contained in it, as is evident from the taste.

Vicia sativa, Linn. Walter. Tare. Grows abundantly around Charleston. Fl. June.

In England, a decoction of the seeds in water is used as a sudorific in small-pox and measles. The seeds are a good food for pigeons. Fl. Scotica, 396; Mér. and de L. Dict. de M. Méd. vi, 892.

V faba. Garden bean. Cultivated.

Pisum sativum. Pea.

Great use is made of the varieties of the pea on the plantations in this state, as articles of food for men and animals. The species called the cow-pea is most in use; I have been unable to find, and do not believe that there exists any accurate botanical description of this very valuable plant. It seems, however, from my examination, to be included under the genus *Vicia.*

Amphicarpa monoica. Grows in rich lands. Fl. July.

Ell. Bot. Med. Notes, ii, 322. The subterranean pod is cultivated as a vegetable.

Arachis hypogæa. Ground-nut. Brought by the negroes from Africa. Fl. May.

Mér. and de L. Dict. de M. Méd.; Supplém. 53, 1846. The fruit preserves its germinative powers for forty years. Boudich Excurs. 392. Large quantities are exported from Senegal on account of the oil which is expressed from them, and which is much valued. Ermandel "On the cultivation of the ground-nut, and its employment as a substitute for coffee," Journal de la Littér. Étrang. ix, 169; Du Buc, Mem. on the use of A. hypog., and an examination of its oil (in French); see Journal de Pharm. viii, 231; Rivoli, Lettre sur l'Arachis hypogæa, Milan, 1807; Donmen, Notice sur l'Arachis, Montpellier, 1838. According to the analysis of Pagen and Henry, it is very difficult for the oil to become rancid. Journal de Chim. Méd. i, 435; Ann. de Hist. Nat. iv, 206; Gurnin, Mém. sur l'Arachis,

Biblioth. Physice Écon. i, 145; Tessier, Mém. sur l'Arachis, Avignon. The seeds, parched and ground, can with difficulty be distinguished from coffee, as I have myself experienced. In some portions of South Carolina it is employed as a substitute. The okra (*Hibiscus esculentus*) serves the same purpose. The ground-nut and *bené* make rich and nutritious soup, and act as substitutes for meat. They are often parched, and beaten up with sugar, and served as a condiment or dessert. The ground-nut is cultivated to some extent in South Carolina, and great use is made of it on the plantations as an article of food, and for various domestic purposes; it is exported with profit, but troublesome to prepare. I am not aware of any use being made in this state of the oil which it affords on expression. The authorities cited above will afford much valuable information.

The above was published in my report on Med. Botany, S. C., 1849. Since the war it is largely employed. The superintendent of the Rockfish Factory in North Carolina, writes that he has "used the pea-nut oil by the side of the sperm, and that it works fully as well."

Gleditschia triacanthus, L. Sweet locust; honey locust. Diffused. As far west as Mississippi; I have seen it in lower and upper districts of South Carolina.

Beer is sometimes made by fermenting the sweet pods while fresh. The pores of the wood are very open. When perfectly seasoned, the wood is extremely hard. It is far inferior to the black walnut or wild cherry for cabinet-making. Hedges of it are rendered impenetrable by its long thorns. Michaux, in Farmer's Encyc.

Cassia Marylandica, L. Wild senna. Grows along the banks of rivers; vicinity of Charleston. Fl. July.

Frost's Elems. Mat. Med. 135; Griffith's Med. Bot. 261. It is said to be as safe and as certain in its operation as the imported senna, but more apt to gripe; this may be corrected by infusing fennel seed or some other aromatic with

the leaves. It is prepared in large quantities by the Shakers, and is generally collected after the seeds ripen; one ounce of the leaves is added to one pint of hot water, of which the dose is one to three ounces, repeated. I have specimens of the leaves of the officinal senna, which is cultivated successfully by Mr. W Lucas, of South Carolina, for use on his plantation. He says that it does not appear to degenerate.

Cassia occidentalis, L. } Styptic weed; Florida cof-
" *Caroliniana*, Walt. } fee. Common around old buildings; collected in St. John's; vicinity of Charleston; Columbia. Fl. July.

Mér. and de L. Dict. de M. Méd. ii, 130; Marcgrave, in his Hist. of Brazil, mentions it as a remedy in the poison of venomous animals, and in strangury. In the Supplem. to Mérat, p. 150, 1846, properties are ascribed to it similar to those of the *C. hirsuta*, which is diuretic, acting on the lymphatic system, and employed in obstructions, debility, dropsy caused by derangement of the digestive organs, and as a vermifuge also; forty grains, parched like coffee, are used. It is useful as an application, in the form of a decoction of the leaves, in itch, erysipelatous eruptions, irritation, and inflammation of the rectum. The negroes apply the leaves, smeared with grease, as a dressing for sores. Griffith, Med. Bot. 262; Bouditch, Exper. 392; Chernoviz, Form. 222. Once thought to be very valuable as a substitute for coffee; roots thought to be injurious to hogs.

Cassia chamæcrista, L. Golden cassia. Diffused in dry, sandy soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Trans. Am. Phil. Soc.; Shec. Flora Carol. 390; Mér. and de L. Dict. de M. Méd. ii, 129. The leaves are said to be purgative. It grows in abundance in South Carolina, and should be examined. It is employed in portions of the country for the recovery of worn-out lands; those that are

sandy being particularly benefited by it. See Greenway's account of the domestic uses. *Op. ant. cit.*

Cassia tora, L. Diffused in cultivated soils; vicinity of Charleston. Fl. Sept.

Supplem. to Mér. and de L. Dict. de M. Méd. 1846, 150; Ainslie's Mat. Med. Ind. ii, 405. Used in India.

Cercis canadensis, L. Redbud; Judas-tree. Swamps, vicinity of Charleston; collected in St. John's. Fl. March.

Shec. Flora Carol. 380. "The wood is of great value for mechanical purposes, as it polishes exceedingly well, and is admirably veined with black and green."

Schrankia angustata, T. and G. } Grows in pine lands.
" *uncinata*, Ell. Sk. } Fl. July.

The leaves of this plant possess a remarkable degree of sensibility, or irritability, closing up immediately upon contact with any surface. I have just repeated upon this plant, and in a measure verified the experiments with chloroform and sulphuric ether upon the *Mimosa sensitiva*, made by Prof. Marcet, of Geneva, in illustration of the relations existing between animal and vegetable sensibility.* After trying a number of substances, including the tinctures of opium, capsicum, and camphor, and the solutions of tartar emetic, sulph. morphine, and hyd. potash, without producing any impression, I ascertained that the two anæsthetic agents alone, when placed on the main petiole of the leaves, had, in about five minutes, their influence gradually extended to those above, causing the leaflets to contract *seriatim*. Though sensibility to impressions was impaired by each successive attempt, yet it was never entirely lost. The result of my observations differed from those of Prof. Marcet, but agreed with De Candolle in his analogous experiments with nitric and sulph. acids in its

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* Read before the Soc. de Phys. et d'Hist. Nat., Oct. 19th, 1849. See, also, Sill. Journal, July, 1849.

not disclosing any impressions transmitted downward, or at any rate beyond the junction of the branch experimented on with the main limb of the plant. A drop of the oil of aniseseed placed on a leaf-stalk seemed to have the effect of arresting the transit of any influence beyond it; hence, we may be led to suspect that the impression is conveyed by organs of sensation arranged not far from the surface. In the examination I was assisted by Dr. René Ravenel.

In sensitive plants, *Mimosa*, for example, the movements of the leaves, says Mr. C. Mackensie, quoted by Wilson, have their origin in certain enlargements situated at the articulation of the leaflets with the petiole, and of the petiole with the stem. If by a longitudinal section the lower half of this swelling be removed, the petiole will remain depressed, having lost the power of elevating itself. If the superior half be removed, the petiole will remain constantly elevated, having lost the power of depressing itself. These facts prove that the motions of the petiole depend on the alternate turgescence of the upper and lower half of the enlargement, situated at the point of articulation, and that contractility is not the principle of these motions. The irritation of a burning lens, for example, is felt either above or below. This interior movement M. Dutrochet found was transmitted equally well, even though a ring of bark has been removed; that it is transmissible even though the bark and pith be removed, so that nothing remains to communicate between the two parts of the skin except the woody fibres and vessels; that it is transmissible even when the two parts communicate merely by a shred of bark; and that it may be transmitted even when the communication exists by the pith only; but that it is not transmissible when the communication exists only by the cortical parenchyma. From these very interesting experiments, it results that the interior movement produced by irritation is propagated by the ligneous fibres and the vessels. The propagation is more rapid in the petioles than in the body of the stem, the rapidity having been computed. Absence of light during a certain time com-

pletely destroys the irritability of the plant. The return of the sun's influence readily restores the plant to its irritable state. "It appears, therefore, that it is by the action of light that the vital properties of vegetables are supported, as it is by the action of oxygen that those of animals are preserved; consequently, etiolation is to the former what asphyxia is to the latter." Rural Cyc.

CALYCANTHACEÆ. (*The Carolina Allspice Tribe.*)

Flowers aromatic and fragrant.

Calycanthus Floridus, Linn. Sweet shrub. Specimens from Aiken; I have observed it growing wild in Fairfield district. Fl. May.

One of the most aromatic and sweet scented of our indigenous plants: cultivated on this account in gardens. Dr. Douglass, of Chester district, S. C., sends me a communication from his correspondent, Mr. McKeown, who says he has frequently used it with satisfaction, as an antispasmodic tonic, in the cure of chronic agues. A strong decoction of the seed or bark of the root is given. The wood is strongly camphorated, especially the root, and Mr. Nuttall thinks will probably produce this drug as abundantly as the *Laurus camphora*. Seeds seldom mature.

MYRTACEÆ. (*Myrtle Tribe.*)

Eugenia, Micheli. Allspice family.

Several species of this genus are found in South Florida. See Chapman's Southern Flora. The timber of most *Eugenias* is useful and good. Like the myrtles, their bark abounds in tannin, their soft parts contain a more volatile oil, and the fruit of some, though rendered somewhat disagreeable by the aroma of the oil, are edible. Wilson's Rural Cyc.

SAXIFRAGACEÆ. (*The Saxifrage Tribe.*)

De Cand. considers the whole order as more or less astringent.

Heuchera Americana, L. Alum-root. Grows in damp soils; Richland, Dr. Gibbes; collected in St. John's; Charleston district; found also in Georgia; Newbern.

Coxe's Am. Disp. 112; Lind. Nat. Syst. Bot. 163; U. S. Disp. 390; Barton's Collec.; Mich. Flora Boreal. Americana, i, 171. "A powerful astringent." The powder was employed by the aborigines in wounds and cancerous ulcers. Bart. M. Bot. ii, 159; Mér. and de L. Dict. de M. Méd. iii, 490. It is also administered as a substitute for colocynth. It is used in decoction, tincture, or syrup, wherever an astringent is required—as in diarrhœa, piles, menorrhagia, etc., etc.

BURSERACEÆ. (*Torchwood Tribe.*)

Amyris Floridana, Nutt. Torchwood. South Florida. Chapman.

Nearly all the species afford fine materials in both their resin and their wood for fragrant incense and delightful pastiles. Wilson's Rural Cyc. Our species should be examined. A South American species yields a gum which makes one of the best of known varnishes. Frankincense is said to be got from the *Pinus tæda*. The *Bursera gummifera*, Jacq. of Florida, also yields a balsam.

ANACARDIACEÆ. (*The Cashew Tribe.*)

Trees abounding in a resinous, sometimes acrid, highly poisonous juice, are the ordinary representatives of this order.

Rhus toxicodendron, T. & Gray. }
" *radicans* of authors. } Poison oak. Diffused; common in pine lands; vicinity of Charleston; Newbern. Fl. July.

Trous. et Pid. Mat. Méd. i, 524; Bell's Pract. Dict. 453; Eberle, Mat. Med. ii, 116; Pe. Mat. Med. ii, 603; Ed. and Vav. Mat. Méd, 345; U. S. Disp. 718; Ball. and Gar. Mat. Med. 241; Royle, Mat. Med. 341; Bergii, Mat. Med. i, 248; Mér. and de L. Dict. de M. Méd. vi, 78; Orfila, Toxi-

cologie Gén. i, 45; Ann. de Chim. xxxv, 186; An. Journal de Méd. lxxx, 136; Eberle, Mat. Med. ii, 117; Ell. Bot. 363; Alibert, Éléms. de Thérap. i, 452; Big. Am. Med. Bot. iii, 20; Du Fresnoi, quoted in Ann. of Med. v, 182, and 483; Med. and Phys. Journal, i, 308; vii, 273; and x, 486; Duncan's Disp. 294; Bull. Plantes Vén. de France, 146.

It produces in those who come into its vicinity an erysipelatous inflammation. It is stimulant and narcotic, employed in paralysis and herpes: of the former disease, seventeen cases are reported by one physician to have been successfully treated with it. The juice which exudes on plucking the stem makes a good indelible ink. It is dissolved by ether. Bigelow thinks it is composed of a resin and an essential oil. Purging with neutral salts, the use of opium, blood-letting, and cold applications of acetate of lead are employed in case of poisoning from these plants. The bruised leaves of the *Collinsonia canadensis* (which grows in the Confederate States) are employed for the eruptions caused by the emanations from the poisonous sumachs, and the *Verbena urticifolia*, also found in South Carolina, is likewise considered an antidote. Horsefield, in his Diss., states that he administered the infusion in consumptive and anasarcous patients. Du Fresnoi reports cases of herpetic eruption cured by preparations of this plant; also four cases of palsy. Dr. Alderson, of Hull, has given it with good effect in doses of one-half to one grain, three times a day, in paralysis. Mér. and de L. Dict. de M. Méd. Supplém. 1846, 627 Dr. Baudelocque employs it with success in the chronic ophthalmia of scrofulous infants, a collyrium being made of the alcoholic tincture. Four drachms in two ounces of water is used, afterward augmenting the dose. Rev. Méd. Nov. 1836; A. Howroarth's Hist. R. Toxicod. in Essai Méd. du Docteur Alderson, Lond. 1793; Fontana, Traité de la vipère, ii, 169; Alibert, M. Méd. i, 450. Some have inoculated themselves with it without injury. Biblioth. Méd. xxvi, 395. "On cite un cas mortel par suite d'attouchement des par-

ties sexuelles après avoir manié des rameaux de ce végétal:" Mé. *loc. cit.* See Annal. in Journal de Chim. In employing it for ringworm Du Fresnoi increased the dose of the extract till it amounted to eight grains a day. "Novel effects concerning a dangerous American plant," by Gleditch (in French); see Journal de Physic, 1782; Du Fresnoi, in Actes de la Soc. de Méd. de Bruxelles, i, 136; Wursur, sur le R. Toxicod.; Actes de La Soc. Écon. de Florence, iii, 138; and observations by Wilhmet on the effects of this plant, in Journal de Méd. de Courv. i, 209; Employ. R. Tox. in Thesis, at Montpellier; Ann. de Clinique, vi, 343. Heinning's case of paralysis, cured by R. rad. in Bull. des Sc. Méd. de Férus, iv, 262. It is employed in maladies arising from general debility, and defective innervation. A French writer testifies to the efficacy of this plant in homœopathic doses, in all cutaneous diseases. Dr. Alderson prefers the infusion of the recent leaves; Van Mons the extract of the dried leaves. By analysis, it contains a very combustible "hydrocarbonate," tannin, gallic acid, resin, gummy substance, fecula, etc. Griffith's Med. Bot. 185; and Stephenson and Churchill, iii, 167; Bull. des Sc. Méd. vi, 98; Bull de la Facult. v, 439. An acrimonious vapor, combined with carburetted hydrogen, exhales from a growing plant of the poison oak sumach during the night, can be collected in a jar, and is capable of inflaming and blistering the skin of persons of excitable constitution who plunge their arms into it. The yellow, milky juice turns dark, and forms one of the best indelible inks for marking linen, and is used by the Japanese as a varnish. Rural Cyc. See varnish sumach (*R. vernix*).

Rhus glabra, Linn. Smooth sumach. Grows in the upper districts; found near Columbia, and Augusta, Ga., in wet soils. Fl. May

"If the bark of the root is boiled in equal parts of milk and water, forming with flour a cataplasm, it will cure burns without leaving a scar." The excrescences have been preferred, as an astringent, to tannin or gallic acid.

Dr. Walter employed and substituted them for galls; their sourness is supposed to be owing to malic acid, which is contained in the pubescence. According to Dr. Cozzens, also, of New York, they are astringent, and refrigerant, furnishing with water a cooling drink, useful in inflammation and ulceration of the throat. The excrescences on the leaves of the *R. glabra* which I have gathered (1862) on Tiger creek, Spartanburg district, are as large as persimmons—resemble fruit in appearance—are powerfully astringent, and contain moving bodies like seeds attached to the inner walls, surrounded by a white, cottony substance, probably embryo animals. These glandular excrescences are showy. I would recommend them as a perfect substitute for tannin. I have dried and powdered them. They are a pure astringent. Dr. Fahnestock states that an infusion of the inner bark of the root is employed as a gargle, and is considered almost as a specific in the sore throat attending mercurial salivation. An infusion of the leaves sweetened with honey is serviceable, applied in the same way, and for cleansing the mouth in putrid fevers. The bark is considered a febrifuge. Lind. Nat. Syst. Bot. 166; U. S. Disp. 598; Am. Journal Med. Sci. 561; Mér. and de L. Dict. de M. Méd. vi, 77, where its employment as a gargle is alluded to; Rev. Médicale, i, 1830, 307; Griffith, Med. Bot. 106. The decoction of the root is used by the Indian doctors in the treatment of gonorrhœa and gleet, and as a wash in ulcers. In other words, it is an astringent. The bark of this, the *R. copal*, and the *R. typhinum*, and of the European species, acts as a mordant for red colors, and much use is made of it in the tanning of morocco leather. A vinegar may be prepared from the berries of this species.

I introduce the replies of several correspondents of the Charleston Courier (1862) to inquiries concerning the sumach.

Dr. Abner Lewis Hammond writes:

"The *Rhus Glabra* I consider identical with that so extensively grown for export and manufacturing purposes

in Sicily. The difference, as seen in the size of the leaves, tree, etc., is attributable, no doubt, only to a difference in locality, soil, and cultivation, and to no other. I have seen it flourishing alike on the mountain slopes and in the valleys of Virginia; on the rich table lands and bottoms of Kentucky, Tennessee, and Illinois; on the flinty ridges and barren mineral lands of Missouri. Under cultivation it suckers freely. Looking at its value and importance as a manufacturing agent or material, and its easy production, I have long wondered at its total neglect, and feel no hesitancy in saying that with the same care given to its cultivation by our people as by the Sicilians, it could be as successfully and profitably raised in the one as the other country, and should, under existing circumstances, be neglected no longer. Hundreds and thousands of bags, at heavy expense, are annually imported into the United States for tanning and other purposes, yielding to the growers (after expense) a remunerating profit. The berries, the bark of the tree and roots, have for years furnished the country people here and in the West a most substantial dyestuff (a brilliant black), while its prepared leaves (ground) have been as steadily used (to the full extent of the available quantity) in the preparation of morocco."

A correspondent ("E") writes from Graham's Turnout, South Carolina:

"Your article, and a subsequent communication lead me to believe there is more importance in the sumach than I ever attached to it. When a small boy I recollect to have gathered bushels of the berry on the mountains in this state for the purpose of having the wool dyed black for the woof of our home-made jeans. I have learned something from your correspondent, and will try its use in shoemakers' wax (as he stated.) There can be any quantity gathered in this section almost without any charge.

"Should any one wish to try dyeing wool, they will find it one of the handsomest black dyes known to me."

Dr. Wm. Jeuson, of Charleston, writes:

"Sumach—*Rhus Glabra*—figured also as *Rhus Virginicum*, better known as smooth sumach, and variously called Pennsylvania sumach, upland sumach, is a native of most parts of the continent of North America. Grows in dry, uncultivated places, flowering early in July, and succeeded by dense clusters of crimson berries, which, when mature (about early autumn), are covered with a whitish and very acid efflorescence (often used to make vinegar in country localities.) The bark and leaves are *astringent*, and said to be used in tanning leather and in dyeing. Excrescences are produced under the leaves resembling galls in character. These have been used by Dr. Walter, of New York, who thought them in every respect preferable to imported galls. The only officinal part is the berries, which are used as a refrigerant and febrifuge, though Dr. Fahnestock speaks highly of an infusion made from the inner rind or bark of the root, for a wash and gargle in the sore mouth attending inordinate mercurial salivation. The writer's own experience has been to use the berries in impure water, or when that was not to be obtained, to put them into the mouth to allay the thirst attendant upon riding through the hot, unsheltered, and frequently waterless prairies of the far West. He also knows that a syrup made with the berries is successfully used in the fall fluxes, while a drink made with them is a favorite remedy in many localities in febrile attacks. In the sickly year of 1853 the writer used them (the berries) constantly, although frequently changing his atmosphere from the free, open prairie to the confined pestilential air of a city with yellow fever ravaging in it, and without experiencing the slightest indisposition."

James Peckham, of Columbia, South Carolina, adds:

"I have often wondered that no one here has engaged in its cultivation, or rather in gathering and preparing it for market, as it grows all over the country."

The following was communicated by Mr. C. H. Woodin, of Charleston:

"I notice in the Courier an inquiry in regard to the use of the sumach, which grows so abundantly in the lower portions of our state. Your correspondent informs us that it is very beneficial in making shoewax, consequently it was called *shoemach.* But the sumach is not only used for making wax, but it is extensively used in the New England and Northern states for tanning purposes."

"The sumach leaf is invaluable in tanning fine hog skins and skirting, and it is shipped in great quantities from South America to all the principal tanneries in the North.

"The process is this: It is well known to every tanner that the most important thing in making good leather is to have it properly colored, and that it is not crisped or parched on the grain in the "handlers."

"The shoemac leaf is put into a vat which is intended for a "handler," and then the vat is filled with clean, fresh water, and when it has stood until the strength is entirely out of the leaf, the skin or stock is taken from the "*bait,*" rinsed in the "pool," and then placed in the "handler." The stock is then turned or handled as in other processes, until the grain is properly colored. It is then taken through the regular process of tanning, and when it is scoured it is perfectly white. The stock should be tanned with white oak, or some other kind of mild bark.

"The advantage of the sumach is this: That the stock comes out fair and good, while in other processes the grain has to be made white by acids, which injures the stock very much. Tanners intending to make fair leather would do well to make a note of this information."

See "Sweet Gum" (*Liquidambar*) for my examination of this, the sumach, and other *leaves*, as substitutes for oak bark.

Rhus vernix, L. Ell. Sk. } Poison sumach; swamp su-
" *venenata*, D. C. } mach; poison elder. Grows in the upper districts, and in Georgia; collected in St. John's; vicinity of Charleston. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 82; Lindley, Phil. Trans. vi, Abridg. 507; Sherard, do. 508; Kalm's Travels, i, 77; Marshall's Abstract, 130; Cutler, Am. Acad. 427; Big. Am. Med. Bot. i, 86; Bart. Coll. 24; Thacher's Disp. 321; see Big. *R. vernix*, Nouv. Journal de Méd. xv, 43; U. S. Disp. 718. This also gives out a poisonous exhalation; some are even affected by the atmosphere around it. It is thought to be identical with one in Japan, which furnishes a fine varnish much used in that country. Dr. Bigelow ascertained that the juice, which flows in large quantities from our tree when wounded in the spring, affords a brilliant, glossy, black varnish. Mér. and de L. Dict. de M. Méd. Supplém. 1846, 628. See Thunberg's Voyage, vi, 15, for a notice of the oil extracted from the seeds. Lind. Nat. Syst. 168; Linn. Veg. M. Med. 56. It is styptic and astringent, and the resin is used as an ointment in piles. Bigelow, in his examination of the juice, referred to above, believes that it consists of a resin and an essential oil. He first boiled it till the volatile oil had escaped; the remainder, being reduced almost to the state of a resin, was applied warm as a varnish. Dr. Pierson reports an interesting case of poisoning from this plant; and it is said that some individuals have been injuriously affected by the fumes from the wood of this and the *Rhus radicans*, accidentally burnt on the fire. A swarm of bees was poisoned by alighting on one of these trees. New York Medical Repos.

Rhus copallina, Linn. Walt. Wing-rib mountain sumach. Diffused. Vicinity of Charleston; Florida and Mississippi, and northward; collected in St. John's; Newbern. Fl. July.

Ell. Bot. 302; Ed. and Vav. Mat. Méd. 136. A wash is applied to ringworms. The root is used by the Chippeway Indians as an antivenereal. The excrescences on the leaves are powdered and made into an ointment as an application to hemorrhoids. Griffith, Med. Bot. It does not afford copal. The leaves were mixed with tobacco, and used by

the Indians for smoking. The sumach is said to form an ingredient in the manufacture of "Killickinick" tobacco. The berries are quite sour, and afford, with water, a cooling drink.

Wilson asserts in the Rural Cyc. that the *R. copallina* does contain copal. "The resin from this shrub exists in smooth, brittle, translucent, roundish, small masses; has little taste, and scarcely any odor; is fusible by heat, inflammable by ignition, insoluble in water, very sparingly soluble in alcohol, and fully soluble in sulphuric ether and some essential oils. It is the characteristic ingredient of the well known copal varnish, an article requiring operose and careful manufacture, but distinguished for the brilliancy, durability, hardness, and resistance of its exquisite polish." Consult "*Liquidambar*" for detail of experiments. By my experiments the *leaves* of the *Rhus* contain more tannin than either the sweet gum, myrtle, or any of the fifteen or twenty that I examined by reagents. I am also convinced that the excrescences abundant on the *Rhus glabra* (or smooth sumach) would furnish an excellent material for the supply of tannin. Upon drying, and examining them, I find the tannin in a highly concentrated state. They would be suitably used wherever an astringent is required in medicine, and should be added with the leaves to the tan-vat. See article "*Quercus tinctoria*" in this volume, for trees furnishing tannin and gallic acid.

Rhus pumila, Mich. Ph. Upper districts; Newbern. Fl. August.

U S. Disp. 719; Mx. Flora Americana. According to Pursh, it is the most poisonous of the species.

Rhus typhina, Walt. Flora Carol. Fl. July.

Mér. and de L. Dict. de M. Méd. iv, 82; see Analysis, in Journal de Chim. Méd. iv, 511. Lassaigne says that this contains malic acid. The incised bark yields resin. It is employed in preparing morocco leather. See *R. vernix*, etc.

Rhus coriaria. This species of sumach is exotic, and is the principal plant cultivated in Sicily for export. I insert the following, in case it shall be found expedient to "exploit" or plant our wild sumachs which are found so abundantly in rank meadows; particularly abundant, I have observed, in the Dismal Swamp, Va. I think it is sufficiently abundant there to supply almost any amount for the purposes of the tanner or dyer:

"In the best sumach one hundred grains of the leaf should give thirty to thirty-five grains of pure tannin. The proper adaptation of the land can be ascertained by testing the leaves with sulphuric ether. 'Use as much sulphuric ether as will dissolve the sumach, or pass it through the sumach till it runs clear, then draw off the ether by heat, and the deposit will be pure tannin.' A rough test for tannin is prepared with a solution of sulphate of iron, or may depend upon its coagulation of albumen.

"The sumach is thus cultivated near Palermo: The soil is prepared as for potatoes, with furrows from two to two and a half feet apart, in which in January or February are placed the young suckers two and a half feet apart. In August of the first year the leaves on the lower part of the branches are drawn off with the thumb and finger, leaving a tuft on the top. In October the whole head is taken off, or sometimes broken, and left hanging by the bark till dry. The second year, in June, the branches are stripped of ripe leaves; and in August, as soon as the whole plant is mature, it is cut with a sickle down to six inches. It is then spread out, and dried thoroughly on each side till entirely cured. The June gathering is omitted in many cases when the plants are not strong. After being dried the branches are put upon a floor and thrashed, when the leaves will separate from the wood, which is of no value except for fuel. The leaves are then ground between two millstones, one of which is on edge, and revolving around a centre. We visited a mill driven by steam-power, which threw out the powdered sumach in large quantities. The air was filled with fine particles of dust, which covered our

clothing, and entered the lungs. It is not injurious, however, for although it seemed suffocating, the workmen will sleep three or four hours successively in it, and are always remarkably healthy. They were particularly exempt from cholera. The leaves are readily reduced to powder while the stems are not. These last are then separated by sifting, and the pure sumach is placed in bags of one hundred and sixty-three pounds for shipment. Two thousand pounds of ground sumach to an acre is considered a good crop."

This corroborates my own suggestion regarding the employment of *leaves* for the supply of tannin. See article Tannin, and Sweet Gum (*Liquidambar*), for my comparative experiments upon the leaves of gum, myrtle, etc., for tannin. Both these trees grow abundantly everywhere, and will easily supply a large amount of tannin, to be used as I suggest—in place of oak bark.

Most of the plants containing tannin will furnish a black dye, with iron. "The basis of *black dyes* for all organic fibres is the tannogallate of iron; but the modes of application vary with the nature of the fabric, whether silk, wool, or cotton. The finest blacks are obtained by a combination of colors; thus, a rich black is imparted to wool by grounding it with a deep, indigo blue, then passing it through logwood, galls, or sumach, and finally through a bath of these, with copperas and verdigris, or immediately through the latter." Wilson's Rural Cyc. See, also, Ure's Dict. of Arts, article "Calico Dyeing." Any of our plants containing either tannin or coloring principles can be used as dyes, with alum or iron.

There is a paper by John M. Marston on the cultivation of the sumach in Sicily, in Patent Office Reports, 1851, p. 60. I believe that the great abundance of sumach in the Dismal Swamp, Virginia, would supply for a long time all we would require—besides, it grows abundantly in our savannas, and among myrtles throughout the country. Mr. Marston thinks that the superiority of the Sicilian sumach lies in the mode of cultivating it—"all the leaves

are the production of the *young sprouts* that spring up from the stump every year." The middle Southern states he thinks adapted to its growth. "The export of sumach to the United States last year was 65,000 bags."

I quote as follows from the letter:

"Sumach is an article of commerce to the Sicilians of great importance, as it is also with the Americans. And, it is my opinion that this article, so valuable for manufacturing purposes, for tanning, etc., can be produced in the United States in sufficient quantity to supply the world, if the mode of its culture be understood, and proper attention be paid to it.

"I have no idea that it is the same kind that grows in the United States, which there runs to the size of trees. In Sicily they plant the roots or small plants from two to three feet apart; rows about four, so that the plough or harrow can save the hand labor of the hoe. They hoe it two or three times before the rains finish in May, and gather it in July and August. The leaves are the only parts made use of. After being separated from the twigs by thrashing (or, in this country, both ways — by thrashing and treading off with oxen and horses), the leaves are then ground to the state of fineness in which you see it in the United States, being passed through sieves or bolting-cloths of sufficient fineness, and put into bags of one hundred and sixty pounds each. The proper season for planting the roots or plants is in November, December, and January. When the season is rainy, the plants take root better. The root or stump is cut off from four to six inches above ground. The scions or sprouts spring up four to six out of each root; and when at maturity, which in this island is in July or August, they are all cut off at the stumps, and laid in small handfuls to dry, say for a day or two. Do not spread them out much, as the sun will turn the leaves yellow, and great care must be taken that no rain falls on them. Perhaps, in this country, it may answer to plant nearer together than would be advisable in America, on account of the greater heat of the sun here, and thus shade

the ground better. The leaves are ground in mills mostly by horse-power; but water or steam-power would be much cheaper and better. The perpendicular running stones weigh nearly three thousand pounds; they run double or single round an upright shaft. The nether or foundation stone is heavier, and one-third greater in diameter than the running stones. The grinding surface of these latter is slightly rough, being occasionally touched with the pick or cold-chisel. Hard granite stones answer; here they use a volcanic stone, which is as hard as marble. There follows round the running stones a little piece of wood that keeps the leaves always under the stones. When ground fine enough, it is sifted or bolted in a large, tight room, with a door to enter and fill the bags. In Sicily the article is more or less adulterated with spurious stuff, such as other kinds of leaves, and an article called *bucca*, which resembles the juniper bush of New England; this has no value in itself. I believe the first year they do not cut off the sprouts. In the second and following years a curious freak of nature produces a single plant a foot or so distant from the original root; and this little plant it is which they usually make use of to transplant. Now, the plough or harrow would prevent these from growing, as they would be in the track, and this may be the reason why they hoe it. Still, I think the plough or harrow must be used in our country, and some way or other contrived to save these little plants if wanted."

VITACEÆ. (*Vine Tribe.*)

Vitis bipinnata, T. and G. (*Ampelopsis*, Mx.) Margins of swamps, Florida, and northward; abundant, bearing black berries in bunches.

Attracted by the sweetish taste and the purplish black hue of the berries of this plant, which is closely related to the grape, I succeeded (1862) in extracting a beautiful *dark purple* by the following process: The berries were mashed in a mortar, vinegar was added, with a small quantity of powdered alum. The mixture was then boiled, and

the yarn, or other material, previously wrung out of water, put in while hot. The color of articles dyed is said to be fixed more firmly by subsequently dipping them when thoroughly dried in boiling salt and water.

Vitis, Grape.

My friend, the late Major John Leconte, in a paper on the "American Grape Vines of the Atlantic States," has given the conclusions of an experienced botanist in regard to the wild species. His change of residence North and South gave him a good opportunity to study the various species. He is of the opinion that a grape adapted to the production of wine in the Confederate States would be ill adapted to the Northern states, which are colder, and less humid, and dry. "Thus, the Scuppernong grape can never perfectly ripen north of Virginia, and the fox grapes of the North will scarcely grow in the lower parts of Carolina and Georgia; the Isabella, or Catawba varieties of this last, which were originally brought from the upper regions of South Carolina, do not flourish in the low country, and will scarcely live in lower Georgia." To remedy the want of the sweet principle in a grape, nothing more is necessary than to boil down the must, before fermentation, until it is considerably reduced.

Major Leconte considers it quite possible to make wine that will keep without alcohol; also, that our American grapes do not require the pruning adopted in Europe. See Patent Office Reports, 228, 1857, for a critical account of the species of grape growing in the Atlantic states, and Chapman's Flora of the Southern United States, under genus "Vitis," for grapes exclusively Southern. "Bland's Grape," *V palmata*, so highly praised by Major Leconte, as being equal to any variety of the European grape, which he says grows in the mountains of North Carolina, is not included by Chapman as a native. It is the *V Virginiana* of Poiret.

A writer recommends the use of natural *caves* as wine cellars. Drs. Gall and Petiol's "Method of wine making,

according to the modern principles adopted in Germany and France," is published in Patent Office Reports, 1859, p. 95. The same volume also describes the construction of cellars and vats, etc. Gov. Hammond, of S. C., has had a large cellar built for wines, sugar cane juice, etc. These seem to me essential.

A correspondent says that foreign grapes must be laid in straw during the winter.

H. W Ravenel, also of Aiken, S. C., who has been investigating the native grape with his known ability as a botanist, in a paper published in Patent Office Reports, 1857, gives an enumeration of our four American species of grapes so far studied. Under these, viz: *V labrusca*, L., fox grape, *V æstivalis*, Mx., summer grape, *V cordifolia*, Mx., winter or frost grape, *Vulpina*, L., bull grape, or *Bullace*, he classes the varieties which have proceeded from them. The *V rupestris* of Scheele is found in Texas.

Mr. Ravenel makes a statement which is instructive: "All the species of *American* grapes are *diœcia polygamous;* that is, some of the vines bear staminate or barren flowers only, and are forever sterile; others bear perfect flowers, and are fruitful. All the species of the *Eastern hemisphere* are *hermaphrodite;* that is, every vine bears perfect flowers, containing stamens and pistils in the same corolla, and are fruitful. In the absence of other evidence, this fact would be conclusive of the parentage of an unknown seedling, whether it be of exotic or indigenous origin." The varieties of foreign grapes are referred to a single species, *V vinifera*, L.

Professor C. T. Jackson, in a communication in Patent Office Reports, p. 42, 1859, remarks, in reference to the preservative power of sugar in making wine, as follows:

"We must find out the proportion of saccharine or alcohol-producing matter in the American grapes, for if they will not produce alcohol in sufficient proportions to keep the wine from souring, we should have to add saccharine matter in some form to make a sound wine." In many portions of the country, it is found necessary to add sugar

to wine. Jackson says that those grapes "which contain less than 15 per cent. of saccharine matter will require sugar or alcoholic spirit to be added to them, in order to make a wine that will keep." See, also, notice of Prof. Wm. Hume's paper, further on, and Patent Office Reports, 1859, p. 59, for proportions of acids and sugar in American grapes, cultivation and preparing wine, gathering grapes, apparatus, and making of wine in detail, p. 55, *et seq.*

See a paper with full description and mode of cultivation of wine, with manufacture of wine near Cincinnati, in Patent Office Reports, 1848, pp. 6–14. The value and amount of yield per acre is also given in this paper. I will extract a portion of it:

Selecting and preparing the ground.—A hill-side with a southern aspect is preferred. If the declivity is gentle, it can be drained by sodded, concave avenues; but if too steep for that, it must be benched or terraced, which is more expensive. In the autumn or winter, dig or trench the ground with the spade all over two feet deep, turning the surface under. The ground will be mellowed by the frosts of winter.

Planting.—Lay off the ground in rows three by six feet; put down a stick, twelve or fifteen inches long, where each vine is to grow. The avenues should be ten feet wide, dividing the vineyard into squares of one hundred and twenty feet. Plant at each stick two cuttings, separated six or eight inches at the bottom of the hole, but joined at the top. Throw a spadeful of rich, vegetable mould into each hole, and let the top eye of the cutting be even with the surface of the ground, and if the matter is dry, cover with half an inch of light earth. The cuttings should be prepared for planting by burying them in the earth immediately after pruned from the vines in the spring. By the latter end of March, or early in April, which is the right time for planting, the buds will be swelled so as to make them strike root with great certainty. Cut off close to the joint at the lower bud, and about an inch in all above the upper.

Pruning.—The first year after planting cut the vine down to a single eye (some leave two), the second leave two or three, and the third three or four. After the first year, a stake, six and a half or seven feet long, must be driven firmly down by each plant, to which the vines must be kept neatly tied with willow or straw as they grow. Late in February, or early in March, is the right time for spring pruning in this climate. Summer pruning consists in breaking off the lateral sprouts and shoots so as to leave two strong and thrifty canes or vines—one of which is to bear fruit the ensuing season, the other to be cut down in spring pruning to a spur to produce new shoots. These may be let run to the top of the stakes, and trained from one to the other, until the wood is matured, say in August or September, when the green ends may be broken off. One of these vines is selected next spring for bearing fruit, and cut down from four to six joints, and bent over and fastened to the stake in the form of a bow. The other is cut away, as well as the fruit-bearing wood of the last year, leaving spurs to throw out new wood for the next, and thus keeping the vine down to within one and a half to two feet of the ground. Nip off the ends of the fruit-bearing branches two or three joints beyond the branches of grapes, but do not take off any leaves. If both the cuttings grow, take one up, or cut it off under ground, as but one vine should be left to each stake.

Culture.—The vineyard must be kept perfectly clean from weeds and grass, and hoed under two or three times during the season. Keep the grass in the avenues around down close. About every third year put in manure by a trench the width of a spade, and three or four inches deep, just above and near each row; fill in with two or three inches of manure, and cover it up with earth.

Wine making.—Gather the grapes when very ripe; pick off the unsound and unripe berries. The bunches are then washed in a washing-tub, or passed through a small mill, breaking the skin, but not the seed, and thrown into the press, and the screw applied until the skins and seeds are pressed dry.

Fermentation.—This process is very simple. The juice is put into clean casks in a cool cellar, and the casks filled within about four or five inches of the bung, and the bung put on loosely. The gas escapes, but the wine does not run over. In two to four weeks, generally, the fermentation ceases, and the wine clears; then fill up the casks, and tighten the bungs. In February or March rack off into clean casks. In the spring a moderate fermentation will again take place; after that the wine fines itself, and is ready for bottling or barrelling. Use no brandy or sugar if the grapes are sound and well ripened. Keep bunged or corked tight, and in a cool cellar, and the wine will improve by age for many years. A paper on "North Carolina Grapes," p. 48, may be consulted in Patent Office Report on Agriculture, 1851. It gives an account of wine made from the wild fox grape, and others, and discusses some of the native varieties. Johnston's Chemistry of Common Life, vol. 2, Chaptal's Chemistry, in its relations with Agriculture, chapter on "Fermentation," Ure's Dictionary of Arts, article Wine, "Fermentation," etc., may be consulted for information as to the processes of wine making. See DeBow's Review, and DeBow's "Industrial Resources of the South and West," in three volumes, for articles on cultivation of grape, and wine making at the South; also, Patent Office Reports, 1859, p. 72, for a very full and detailed account of cultivation of grape, manufacture of wine, construction of vats and cellars, by Dr. Weber, of Washington. I regret that I cannot condense this article.

In Missouri and Ohio it is found that the *Catawba* grape, a native of the Atlantic sea-coast, is liable to rot, and to be affected by mildew. A writer in Patent Office Reports, 1854, p. 453, recommends several hardier varieties, viz: The *Halifax* (wine mild and spicy), *Norton's Virginia seedling* (wine fiery and aromatic), the *Rockhouse Indian*, which is said to produce a wine not inferior to the best Burgundy. The writer gives some directions about the culture, and adds: "In the place of putting the 'bung loosely' on your

casks during fermentation, put on the bung-hole first a grape leaf, and upon that a small bag filled with fine and not quite dry sand. In good cellars, and large casks your wine will, and must not clear in less than six or eight weeks. Rack off in March, then again in midsummer, and again just before the time of the next harvest. Before every racking, have your cask well sulphurated. Then your juice is real wine and may be bottled; it will keep as long as you please, and improve considerably for a series of years." I introduce the above, as it seems to contain some practical directions.

The "rot" in grapes is caused by an excess of moisture about the roots, and moist and damp weather. Vineyards located upon "still, cold, clayey subsoils, which unavoidably retain the excess of moisture and produce injurious effects, can be obviated by thorough draining, or by selecting soil which is warmer, lighter, and richer in the ingredient most favorable to the vine."

The "mildew" is often a most serious cause of disease in grapes, extending over entire sections of country, as almost to discourage the cultivation. It is considered to be a parasitic fungus. See a paper on this subject in Patent Office Reports, 1854, p. 311, by J. F Allen, of Mass. In the New England states the presence or absence of this fungus depends upon the condition of the weather, and the progress in maturity of the vine in August and July. There the fungus appears during foggy weather, resembling a white mould. In Reports for 1853, p. 311, an engraved illustration is given of this mildew fungus. "When a grape becomes affected by it, the fruit will either dry or crack open, unless checked or destroyed before it makes much progress. The so called disease is a living plant, most rapid in its growth, and wonderful in its powers of reproduction and multiplication. When a vine has once been infected by it, the seeds or sporules in countless millions lie waiting a favorable atmospheric change to spring into life; and when this does occur, so rapid is their growth that in one day the under side of the leaf will be

almost covered." The plan of dusting the leaves with sulphur is impracticable. The writer says he has found a wash quite effectual in destroying this fungus, and it can be applied on a large scale with the garden engine; on a smaller, by the syringe or the nose of a watering-pot.

"To prepare this wash, take one peck of lime, not slaked, and one pound of sulphur; put them together in a barrel, and pour hot water over them sufficient to slake the lime; pour on this three gallons of soft water, and stir the mixture well together. In twenty-four hours it will have settled and become perfectly clear. This should be drawn off as clear as possible. Half a pint of this mixture added to three gallons of water will be sufficiently strong, and may be applied over the fruit when mildew first appears. It can be repeated every few days, if occasion requires. The first application I have found would kill the most of it; a second and third are all that I have ever found necessary for the season. The fruit and foliage have ripened fully on the European varieties. The American or native varieties are less subject to the attacks of this fungus than the European. There is also a difference in these, the Catawba and Isabella being more attacked than some other kinds. That this mildew or fungus requires a peculiar condition of the atmosphere to allow of its vegetating is a hopeful fact for the people of the European grape-growing regions. A series of seasons unpropitious to its growth may destroy millions of sporules or seed vessels deposited upon their vineyards."

I have seen grapes attacked with a disease, an apparent blackening or rot of the internal portion of the fruit, which had never been attacked until the arbor was covered over, and thus the requisite amount of light was diminished. In this case they become diseased from too much shade and moisture, and the remedy is plain.

Wilson in his Rural Cyc. furnishes from several sources recipes in his article on "Wine" for making "Wine from the *leaves, tender shoots, and tendrils of the vine;* if judiciously prepared, it is so excellent that Mr. MacCulloch compared

it to 'white hermitage.'" See, also, MacCulloch's Treatise on Wine making. Excellent wine is also prepared from the unripe berries, *loc. cit.*, where the method is given. It is as follows: the claret vine leaves, as he observes, will produce a red color, and this tree could be cultivated for the express purpose. Having repeatedly prepared red and white leaf wine, we can with the greater confidence offer a few abbreviated extracts from Mr. MacCulloch's book, previously observing that the specific gravity of the liquor must here also be taken as the criterion of strength; the proportions are calculated for ten gallons of wine. The leaves should not have attained their full growth, and must be plucked with their stems. On forty or fifty pounds of such leaves, seven or eight gallons of boiling water are poured, in which they are to infuse for twenty-four hours; the liquor being then strained off, the leaves are to be forcibly pressed. A gallon more water is to be added, and the leaves again are to be pressed. A screw wine-press with hair bags, is very useful in the process. Sugar, varying from twenty-five pounds to thirty pounds, is then to be added to the mixed liquors; the quantity is to be made up to ten gallons and a half. Such are the essentials of Mr. MacCulloch's directions. We need only add, continues the editor, that if a fermenting, lively wine be contemplated, the manufacture must be conducted as in the process for Champagne, and the smaller of the two proportions of the leaves, etc., is to be employed. The specific gravity of the must should be 1.110 to 1.115. The fermentation must be carried on for a short time in the open vessel, or till the gravity be reduced to 1.090; and the barrel will require to be filled, and be kept full, in order to carry off the froth and leaven that rise to the top of the liquor. But we apprehend that grape leaves are better qualified to produce a dry wine, and therefore the larger proportion of leaves, etc., should be employed, and sugar to the extent that will raise the gravity to 1.120. In this case the fermentation must be conducted in the manner already stated for the production of a dry wine from green grapes; and when perfected, and

the wine becomes bright, it is to be fined and racked off during clear and cold weather, then returned to a clean and sweet cask, and bunged close. A second fining and racking may be required. Grape wine made from the green berries, we have found delicious in flavor, and quite fit for the table in two years or less. But the liquor obtained from the leaves contains a quantity of vegetable extract which conveys a flavor that time alone can subdue; hence, we recommend, the author adds, that it be always retained two years in the cask, and be bottled in the second winter. It ought, also, to remain during one entire year in the bottles. Wilson's Rural Cyc., art. "Wine."

The following brief statement of the mode of making wine, by J. S. Reid, of Fayette county, Ind., appears so simple, that I quote it here. (See P O. Rep. 1855, p. 308):

"The mode adopted by me of making wine is as follows: From the 1st to the 15th of October, I continue pulling the grapes, always selecting the ripest ones first, and after mashing them in a tub made for the purpose, subject them to a small press made in the form of a cider-press. The barrels into which the juice is put are well washed with cold water, dried, and fumigated with sulphur before the must is put into them. I then place over the bung-hole a piece of tin or sheet-iron perforated with small holes. The must is then allowed to ferment slowly for about three weeks, until the scum caused by the fermentation apparently ceases. The barrels are then filled, and bunged tight until spring, when I rack the wine off into clear casks, washed out with cold water and juniper berries, and fumigated with sulphur as before, to destroy any bad flavor. It is then ready for market; but during this time the casks require to be frequently examined, and filled up, keeping them always full to the bung." The reader can find in the Patent Office Reports of 1855, p. 304, a brief statement by D. Ponce, of Hancock county, Ga., of the method of making Champagne wine in France.

Dr. Wm. Hume, Professor in the State Military Acad-

emy of South Carolina, read a paper before the South Carolina Medical Association, on the "Manufacture of Wines in the South," which has been published in De-Bow's Review, March and April, 1862. It is a well written article, giving the results of experiments, containing an exposition of a plan to obviate the disabilities of climate opposed to the manufacture of wine in South Carolina.

In brief, Prof. Hume advises that the two qualities of sweetness and acidity in wines (which vary in different varieties and at different seasons) should be ascertained and considered by the wine maker. The latest date compatible with the full and perfect maturation of the grape should be selected for gathering, so that they should be as little acid and contain as much sugar as possible.

Cellars should be constructed in order to prevent acidity during fermentation, and if necessary alcohol, brandy, or whiskey should be added, to preserve the preparation from turning sour, and also to procure different varieties of wine. I would refer the reader to the articles for an agreeable and forcible exposition of the author's views. He rejects the idea that it is useless or improper to modify the juice of the grape by alcohol under its various forms. Many wines are to a certain extent factitious, but not adulterated. The writer says: "I have clearly shown that the purely manufactured wines of Aiken are either too acid or too weak in spirit—that these defects proceed from immaturity of the grape, and from the high temperature of the must during fermentation. The high temperature induces two evils which are injurious to wine, viz: the loss of alcohol by its conversion into acetic acid, and its loss by more rapid evaporation during the exposure of fermentation." Cool cellars are certainly one obvious desideratum. The addition of alcohol to wine as a preservative agent has been referred to by writers: "The object and intention of adding alcohol to recent grape juice is to preserve it through the months of August, September, and October unchanged by fermentation. During the month of November the cool weather is sufficiently established, and

continues in Aiken to conduct the vinous fermentation without the apprehension of the acetic; hence wine, not vinegar, can then be made." (Hume).

The reader can find a good account of fermentation and the rationale of manufacture of various liquors in Solly's Rural Chemistry, p. 164, *et seq.* Drs. Gall and Petiol also refer to the process of "ameliorating" the wine made from the wild grapes by the free addition of sugar dissolved in water, adding also tartaric acid if the acid is deficient. The husks or pomace which remains is again treated with sugar, water, or acid as long as any wine extract remains, and so an enormous amount of wine is made at small cost. In this process the grapes are mashed, not pressed. See details, P O. Rep., 1859, p. 97 Tables for calculating the acid and sugar are described. I regret not being able to give this method in full.

In connection with Prof. Hume's project of adding alcohol to wine, I extract the following from an article on the "Grape and Wine culture in California," P O. Rep., 1858, p. 342. "Angelica is a sweet wine, which is never allowed to ferment. It is made by adding brandy to white wine, which is the first and purest juice that runs from the press, in the ratio of one to three, as it comes from the press. *It is thus kept from fermentation, and always remains sweet.* It is immediately put into close casks, and drawn off as soon as it is clear, which is generally within four or five weeks. The casks for Angelica wine have to be prepared with great care by sulphuring. "Aguadiente" (brandy) only can be used in making Angelica, as it has the true grape flavor, which most other brandies have not. This brandy is distilled from wine made from leaves or from the pomace (skins of the grapes) of the pressed grapes. It takes about five gallons of wine to make one of aguadiente." By this it will also be seen that the shape in which the alcohol is added is material. Let us compare the following with our difficulties here in South Carolina and Georgia. Italics are my own. Matthew Keller, of Los Angeles, Cal., says: "The manufacture of

wine, in a suitable climate, is simple, and may be done by any one of ordinary intelligence. *But when the climate and soil are not adapted to the nature of the grape*, then, indeed, it becomes a complicated art. One of the most essential things to be observed in its manufacture is the proper regulation of temperature, particularly during the phenomenon of the first fermentation; and to this the least attention is paid. If the must is too cool, the fermentation is slow, and apt to sour; while if there is too much heat, it will soon go into the acetous state. Must which abounds in saccharine matter, and is deficient in ferment, requires a higher degree of temperature than that which has these substances in opposite proportions. The strongest must, even when it contains much ferment, can support a higher temperature than the weak, because the great quantity of alcohol which is developed retards the action of the ferment, and prevents the tendency to pass to the acetous fermentation. The best general temperature is between 62° and 64° Fahrenheit. There is little difficulty in maintaining the temperature in a cellar, but it may be observed that the act of fermentation elevates the temperature. To arrive at that which is the most convenient, it is necessary to pay attention to the temperature of the grapes at the time of mashing them: if picked early in the morning or at noon, it varies many degrees. To obviate this, they may be picked a day in advance, or they should be cooled in a large vat, and *vice versa*. These few facts comprehend all that is necessary to make wine, but they are subject to many variations and much detail, like most other processes of manufacture." The necessity for the display of judgment, and the value of experience in modifying processes, is true of the manufacture of indigo, of sugar from the different variety of canes, etc. No rigid rules adapted to every climate can be depended upon. That vats should be essential, I myself, without experience, felt sure from seeing their necessity in keeping porter and ale in Charleston, or cider in the upper country. We do not manufacture any of them in Charleston, but in order

to bottle or keep them under favorable circumstances, a cool cellar is essential.

The writer quoted above gives the method of making wine in Los Angeles, as follows: "The grapes are deprived of their stems by hand; they are then mashed between wooden or iron rollers; some tread them out in the ancient style. A portion of the juice runs into a cooling-vat, without pressing; the crushed grapes are put into a screw-press and forced out rapidly, all the result being must for white wine. As the grapes are black, and the coloring matter exists only in the skin, and requires in some degree the presence of alcohol to dissolve it, if the pressing be done quickly the wine will be white; but if slowly, or if the grapes come broken from the vineyard, the must will show color; for as soon as the fruit is broken, and the juice comes in contact with the air, fermentation commences, and simultaneous with it, the presence of alcohol, in a greater or less degree, which extracts the coloring matter. The must is then transferred into the fermenting tuns, and the first active fermentation goes on, according to circumstances, for from four to ten days. The mashed grapes are put into vats to ferment, from which results red wine. This is in part distilled into brandy. Some persons distil red wine with the "marc" into brandy immediately after fermentation, but if left to pass a secondary fermentation it would yield more alcohol. The wine is racked off in January and February, again in March and April, and for the third time in September. It should be taken off the lees after the first fermentation subsides, when the wine has settled: for it cannot gain anything by being allowed to stand on the lees longer than is absolutely necessary. *The proportions of saccharine matter and ferment in our grapes are well balanced*, therefore there is no extraordinary art in making wine; as it will make itself with common care, and without the addition of any extraneous substance. The purest and finest wines in the world are made from the juice of the grape alone(?) More capital is needed to make proper cellars, procure necessary materials, and to

enable us to hold our wines till they have age, when they would compare favorably with the best. See also P. O. Rep., 1859, p. 94, *et seq.;* also an extended account of grape culture and wine manufacture, with wood-cuts of presses, etc., in Report 1856, p. 408, by J. A. Warder, M. D., of Ohio. The diseases affecting the grape are also described.

I obtain the following from the Southern Field and Fireside:

Although this subject has been widely discussed, and hundreds of methods recommended, still I see no satisfactory article written which has treated this question as to our Southern grapes and climate. Almost all the writers have confined themselves to the Northern and Western wines and their modes of production, leaving out the idea that Georgia, Alabama, and South Carolina had more resources for wine producing than all the North and West combined, not speaking of the immensely superior quality of its products. I trust that the following hints may be of service to some beginners, and be auxiliary to many masters in the art.

There exist a large number of varieties of wine, differing among themselves by the color, perfume, taste, consistence, etc., and often many such varieties are produced by the same grape. Often those varieties of wine depend upon many circumstances — such as difference in soil and subsoil, exposure, mode of cultivation, climatic influence, degree of maturity of the fruit when pressed, and above all, by the mode of making the wine. The first process is the gathering of the grapes, and this should be one of the most careful. The grapes should be thoroughly ripe, and the best signs of maturity are these: The stem of the clusters changes to brown, the berries become soft, and when the bloom is removed the skin is smooth and nearly transparent, the flavor is vinous sweet, and the seeds free from the pulp and dry. At this point the grapes should be gathered. If gathered sooner the wine will be of an inferior quality, and apt to form vinegar; if later, the wine

will be less in quantity and syrup-like. When the grapes have attained the right period of maturity, select a dry, clear day, and do not begin the gathering until the dew is well evaporated, and the grapes perfectly dry. Use sharp knives or scissors, and remove all green and decayed berries from the branches, and put them in clean wooden pails; then, if the press is some distance from the vineyard, put them in wooden tubs, which must not be too large, so as not to be difficult to handle, and transport by wagon. Now it is necessary to give some remarks upon the process to be followed according to the mode of wine to be produced, and to the variety of grape employed. Our native grapes of the *Labrusca* or fox type are mostly cultivated in this section of the country, and the wine they produce is of the Hock or Rhine wine order. The great value of that wine consists in its delicate aroma, *or bouquet*, and to attain it must be an essential object in its making. To this class belong the Catawba, Isabella, Diana, Delaware, etc., etc., the former of which being most generally cultivated. I will describe the process in its best manufacture.

When the grapes are gathered they must be mashed between wooden rollers. The juice is received in a clean cask or vat, but the hulls, seeds, or stems are carefully avoided to come into contact with the juice. After the whole is mashed it is pressed. The juice which runs out at the time of mashing should be kept separate from the juice which comes from the pressing, as the former will make a wine much more delicate than the latter. The pressed juice will be of a marked color. The casks or vats should be of as large size as consistent with the quantity of the crops. They should be made of the best white oak, with strong iron hoops. The greatest cleanliness is necessary. Wash the casks well, and further fumigate them by burning a wick of sulphur, and keeping the bung closed. Avoid sulphuring too much, as it will give a bad flavor to the wine if done to excess. Fill the cask full, then close it with a tight bung, in the centre of which is fitted a siphon, the lower end of which rests in a vessel filled with water.

The juice of the Catawba, as well as that of all the grapes of that class, should never be fermented upon the hulls, as it then loses its delicate flavor, and only produces a harsh wine—neither a hock nor a claret. The above method is also applicable to the juice of any grapes of which a a white or pale wine is desired. Juice thus treated should be left in the cask until the following spring, after the blossoming of the vine, at which period it will undergo a slight fermentation. It can then be drawn off in clean casks of required size for market, or in bottles; but it will be to its advantage to leave the wine in casks for two or three years before bottling.

The process of making red wine is different—the grapes being mashed, with hulls, seeds, etc., in a fermenting-vat (a cask having one head taken out will answer for a small vintage). A faucet is put at about eight or twelve inches from the bottom; usually a bunch of cuttings is placed in the interior to keep it free from the seeds, etc., in drawing off, leaving a space five or six inches between the must and the lid, which is well fastened, and has also a valve for the evaporation of the gas. This may be also arranged with a siphon, as in the manipulation of the white wine, the end of which siphon must rest in water. In a few hours after the must has been put in the vat the liquid will commence to ferment, the gas will be thrown off in large quantities, and bring upon the surface the stems, hulls, and seeds, which form what the French term *chapeau* (hat). This mass is often very consistent. As soon as the *chapeau* shows signs of going to pieces is the time to draw off the wine from the vat. The residuum is then pressed, and generally makes a wine containing much tannin, and not as delicate as the wine first drawn. The latter wine is kept separate, or mixed with the other wine, as desired. As soon as the wine is drawn in clean casks put the bung in lightly for a few days, then bung it tight. A still easier method is to put a false bottom in the fermenting-vat, which is made from well seasoned wood, and holes bored all over. This false bottom is put upon the hulls to

prevent their rising. Its position must be regulated by the amount of pomace in the vat, and kept steady by sticks. The vat is covered as before with a tight head and siphon, and the period of the drawing off the wine is visible when the fermentation ceases. In general, the fermentation will last from eight to twelve days. This method is applicable to all the colored grapes of the *æstivalis*, or summer grape type—such as Lenoir, Clinton, Jacques, etc. The cellar should be dry, and of an even temperature of about fifty to sixty degrees. After the young red wine is put into the cellar it will undergo a light fermentation. The casks have to be filled occasionally, and kept full to the bung. As soon as dissolution of the sugar and the other constituents of the wine has taken place, the undissolved matter will settle at the bottom, and is called lees. When the wine becomes quiet and settled, it is time to draw it off in clean casks. In the above remarks I have endeavored to compress the wine-making to a small compass, by which it will be seen that it is far less complicated than presumed. I give the different wines obtained from our native grapes.

Varieties belonging to the *Vitis labrusca*, or fox grape:

Catawba. A light colored hock, often equal to the celebrated Rhine wines.

Diana. Also a light colored wine, much more delicate than Catawba.

Delaware. From small experiments yields a wine of the muscatel class, remarkably rich, and very often makes a beautiful, sparkling wine.

Isabella. Makes a wine of a pale red color, if fermented upon the juice, and a darker wine of a claret order if ferfermented upon the hulls.

Hartford prolific, and Concord. A dark, harsh wine. These varieties are not well calculated for wine.

Varieties belonging to *Vitis æstivalis*, or summer grape:

Clinton. Makes a high-bodied wine of the claret order. This variety is destined to be relied upon as our red wine grape at no distant period.

Jacques. Gives a very dark wine of the Burgundy order.

Its juice can be manipulated as for white wines—there being a large amount of coloring matter in the juice.

Lenoir with Clinton. Will give a delicate claret or port.

Warren. Makes a wine of the Madeira class.

Pauline. Somewhat similar to above.

Taylor, or Ballet. A white variety of the Clinton, and doubtless will soon be our standing, or white wine variety.

The Scuppernong. A variety of *Vitis cordifolia.* Yields a wine of the muscat order, but unfortunately sugar and alcohol are too generally added, and thereby a good wine is spoiled.

Many other varieties of our native grapes will soon be experimented upon as to the wine-making qualities; but with the above list we can obtain almost all the classes and colors of wines that are imported in this country.

In Spartanburg district, S. C., they make out of the garden grape a very pleasant wine, which is pure juice of the grape, by the following simple process:

Squeeze the grapes through a bag; to each gallon of juice put one pound of sugar (more may be added); set it away in jars or casks for two or three days, occasionally skimming off all the supernatant froth, scum, etc. Then strain into a cask, adding some honey and brandy. A gallon of brandy may be added to twelve gallons of juice. This wine is said to equal the best quality. Very good wine is also made by adding sugar and brandy to apple cider.

"C. W B.," a correspondent of the Southern Field and Fireside, writes as follows:

Cultivation of Grapes.—Growing Scuppernong grapes in the South is easy, pleasant, and very valuable. My plan is this: In February take the vines that you have rooted the previous year, and set them in some place where you want them, say in rows ten feet each way, with some convenient place for them to spread their branches on, and soon erect a good arbor to each one, and if they are well treated they will soon cover the whole field. The best land for this vine is light, sandy soil, and the best manure is grass, or weeds,

hoed up when green and put under the arbor; also, rotten wood, such as old boards, rails, sticks, etc., piled under the vines. It is also good to have a pen around the roots filled with all the scrap leather, old shoes, bones, brickbats, etc. When the vines begin to grow they must be pruned every spring, for the tendrils will wrap around the branches, and when the branches grow large, die, or break off, it will injure the vine very much; but when they get old a large vineyard would require a great deal of labor, so this part generally receives but little attention when the vineyard is old. This grape is not only useful to preserve and pleasant to eat, but the most delicious wine can be made from them. When they are fully ripe gather them, and they can be ground in a gridder, or if that is not convenient, mash them in a trough; then press them well, putting three-quarters of a pound or a pound of sugar to the gallon; in this every one is to be governed by his own taste. When well sweetened, put it in casks and draw it off from one to another, until it is purified; then bung it very tightly to prevent evaporation, and set it in a barn or cellar six or twelve months; it is then good enough for anybody to drink.

Wine-Farming and Making.—Mr. R. Buchanan, of Ohio, who is one of the most eminent vine-growers of this country, thinks that "wine-farming will, in a few years, become simplified, and almost as easily understood as corn-farming. There is no mystery in it. Experience alone must teach the proper position and soil; the right distances apart for the vines; the most judicious methods of spring and summer pruning; and as for cultivation, keep the ground clean with the plough or cultivator, like corn. Certain rules are given in books for vineyard culture, as pursued in the Ohio valley. These are the European systems, adapted to our own country. It will be safe to follow these rules, until by experimenting we can find better. There is more room for progress in this branch of agriculture than in almost any other.

"Making the wine is as simple as making cider. The great bunches are cut from the vines, and all unsound or unripe berries picked off the bunch and thrown into a bucket, to make — with the addition of sugar — vinegar, or an inferior wine. The perfect grapes of each day's cutting are taken to the wine-house, and in the evening, after being mashed in a barrel with a beetle—stem and berries—or passed through wooden rollers in a small mill, are put on the press and the juice extracted. About one-third runs off without any pressure. The outer edges of the pomace are cut off for eight or ten inches, after the first pressing, separated with the hands, and thrown on top, when the power of the screw is applied, and another pressing made. This is repeated two or three times. The juice from the last pressing being very dark and astringent, is put with the inferior wine. The other is put in large casks filled about five-sixths full, to ferment and make the good wine. No sugar or brandy should be added to the best Catawba juice, or must, as it makes a better wine without, and is strong enough to keep well. One end of a siphon is placed in the bung-hole of the cask; the other being crooked over, rests in a bucket of water.

"The fermentation commences in a day or two, and the carbonic acid escapes through the water. In ten or fourteen days, the siphon may be removed, the casks filled up, and the bung driven in lightly; in a month, tightly. In midsummer the wine is drawn off into another cask, and the lees of the wine, with the pomace of the grapes, are used to make brandy.

"The wine will be clear and pleasant to drink in a month or two after the first fermentation ceases. The second fermentation occurs in the spring, about the time of the blossoming of the grapes; this is but slight, and it will be merely necessary to loosen the bungs; when it is over, the wine will be clear in two or three months, and safe to bottle, but that operation had better be deferred until November. And this is the whole process of making still wine—the wine for general use; and, being a natural product of

the pure juice of the grape, it is more wholesome than any mixed or artificial wine, however showy and high-priced it may be.

"Let the grapes be well ripened; the press, casks, and all vessels perfectly clean, and then keep the air from the new wine, by having the casks constantly bung-full, and there is no danger of its spoiling. This is the whole secret.

"It is presumed that no one will go into wine-farming largely at first; but take the precaution to test, by the cultivation of a few acres, the capabilities of the soil, position, and climate, and the kind of grapes best suited to it."

CORYLACEÆ. (*The Nut Tribe.*)

Properties well known. The seeds oily, and generally eatable; the bark astringent, and often containing coloring matter.

Ostrya Virginica, Willd., Ell. Sk. } Ironwood; hornbeam.
" *carpinus*, Mich. } Richland, Prof. Gibbes; Newbern.

Ell. Bot. Med. Notes, ii, 619; Shec. Flora Carol. 355. Its leaves afford a grateful food to cattle. The wood is tough and white, and burns like a candle. I have suggested this (article in De Bow's Review) as a substitute for wood employed by engravers. It is employed by turners, and wrought into mill-cogs, wheels, etc. A permanent yellow color is imparted to yarn by the inner bark.

The birch hornbeam (*C. betulus*), growing in England, is very much used as a hedge plant, and is said to "afford a more uniform temperature of shade than a brick wall." Our species "is the most elegant of all the hornbeams of Britain." Wilson.

"The *sap of the hornbeam* (*Carpinus sylvestris*) is obtained in the months of April and May. At this period it is colorless, and clear as water; its taste is slightly saccharine; its odor resembles that of whey; it reddens turnsole paper. The sap of this tree contains water in very large

quantity, sugars, extractive matter (probably azotized), and free acetic acid, acetate of lime, and acetate of potash in very small quantities. This sap, left to itself, presents in succession all the phenomena of the vinous and then of the acetous fermentation." Vauquelin's Annales de Chimie t. xxxi, p. 20, first series; Boussingault's Rural Economy, p. 67, Law's edition, 1857

Corylus rostrata, Ait. Grows on the mountains. Fl. March.

Griffith, Med. Bot., 585; Duhamel's Mem. Am. Journal Pharm. Dr. Heubener, of Bethlehem, has employed the short, rigid hairs of the involucre as a substitute for those of mucuna, and has found them equally anthelmintic.

I have collected this plant in fruit on Tiger river, near Reidville, S. C. The hairs are extremely fine, and pierce the skin with facility. I have little doubt with respect to their acting in a similar way with mucuna.

Corylus Americana, Walt. Hazel-nut. Rich soils; along the margin of woods and thickets. West Florida, and northward. Chapman. Edible.

I have seen the hazel-nut growing wild near Summerville, S. C., in Laurens district, and in Powhatan county, Va. Our American hazel-nut is said to be preferred to the filbert. Wilson says that the oil which is obtained from hazel-nuts by pressure is little inferior to that of almonds; and under the name of *nut-oil* is often preferred by painters, on account of its drying more readily than any other of the same quality. Chemists employ it as the basis of fragrant oils, artificially prepared, because it easily combines with and retains odors. This oil is found serviceable in obstinate coughs. If nuts be put into earthen pots and well closed, and afterward buried eighteen inches or two feet in the earth, they may be kept sound through the winter. In many parts of England hazels (*C. avellana*) are planted in coppices and hedge-rows, to be cut down periodically for charcoal, poles, fishing-rods, etc. Being extremely tough

and flexible, the branches are used for making hurdles, crates, and springles to fasten down thatch. They are formed into spars, handles for implements of husbandry, and when split are bent into hoops for casks. Charcoal made from hazel is much in request for forges; and when prepared in a particular manner, is used by painters and engravers to draw their outlines. The roots are used by cabinet-makers for veneering; and in Italy the chips of hazel are put into turbid wine for the purpose of fining it. Rural Cyc. Our species will doubtless answer for all these purposes. Hemp-seed oil also is used by painters. In the countries where yeast is scarce, they twist the slender branches of hazel together, and steep them in ale yeast during its fermentation; they are then hung up to dry, and at the next brewing are put into the wort instead of yeast. Farmer's Encyc.

Fagus Sylvatica. } White beech. Rich, shaded
" *V Americana*, L. } swamps. Richland, Professor Gibbes; collected in St. John's; Newbern. Fl. March.

Shec. Flora. Carol. 559; Griffith, Med. Bot. 585; Fl. Scotica, ii, 583; Linn. Veg. Mat. Med. 175. The bark is astringent, and has been used, according to Dr. Farnham, in intermittent fever; but it is not possessed of any decided powers. The fruit produces vertigo and headache in the human species. It is observed, in the Fl. Scotica, that "the fat of hogs, which feed on them, is soft, and will boil away." The seeds yield an oil little inferior to olive oil, and fit, also, for burning. The pulp remaining after expression may be converted into flour, similar in taste and color to wheat, but sweeter. A narcotic principle, called fagine, has been found in the husks. The young leaves are sometimes used by the common people as a potherb. The wood is valuable to cabinet-makers and turners, for manufacturing purposes—being capable of receiving a high polish. Every kind of implement, plane stocks, tool handles, may be made of this wood, which resists great pressure. In England the beech is extensively used for umbrella han-

dles. See Dickens' Household Words. Liebig states that the ashes of the beech contain a larger proportion of phosphate of lime than those of any other tree. See his Agricultural Chemistry. It is observed in South Carolina that the lands on which it grows are not usually suited for cotton; and we may, perhaps, attribute it to their depriving the soil of this, so necessary a constituent in the maturation of that plant. In the lower country of South Carolina, the beech is one of the most magnificent of our forest trees. Chapman only includes in his work *F. feruginea*, Ait.

By distilling, says Ure, beech tar (*F. sylvatica*) to dryness with other processes, *paraphine* is obtained. "It would form admirable candles," the author adds, while referring to the production of paraphine as an article of commerce from peat. I insert this here (1862) as deposits of peat are found within the Confederate States. The ashes of peat, also, are worth something as manure. They usually, Norton states, contain five or six per cent. of potash and soda, and considerable quantities of lime, magnesia, iron, etc. Soot, a substance somewhat allied, contains a large quantity of ammonia, and is useful as a manure, so much so that when laid on heaps of grass the plants are destroyed. Michaux says that our beech bears a strict analogy with the European beech. The beech should be felled in the summer when the sap is in full circulation; cut at this season it is very desirable. In the *Fagus sylvestris*, white beech, "the duramen or perfect wood, bears a remarkably small proportion to its alburnum. The bark of old trees is used by tanners as a substitute for oak bark." In England beech wood is employed for many purposes—the nuts or mast being given to hogs. See, also, Rural Cyc. The wood of the red beech is stronger, tougher, and more compact than that of the white. In the State of Maine, and in the British provinces, where oaks are rare, it is employed with the sugar maple and yellow birch for the lower part of the frames of vessels. The beech is incorruptible when constantly in the water. The ashes of both species of beech yield a very large proportion of potash. Michaux, who de-

scribes the process of extracting the oil, says that it equals one-sixth of the nuts used. The quality of the oil depends upon the care with which it is made, and upon the purity of the vessel in which it is prepared. It should be twice drawn off during the first three months, without disturbing the dregs, and the third time at the end of six months. It arrives at perfection only when it becomes limpid several months after its extraction. It improves by age, lasts unimpaired for ten years, and may be preserved longer than any other oil. The manner of making beechnut oil most commonly pursued in the districts of the Western states where the tree abounds, is somewhat different from that described in Michaux's *Sylva*. Instead of resorting to the rather tedious process of gathering the nuts, and pressing them through screw-presses, the farmers turn out their hogs immediately after the first frost, who secrete the oil under their skin. Unless they be fed some time before killing upon Indian corn, the bacon has little solid consistency, becomes liquid upon the slightest application of heat, and keeps that state, resembling in that respect the lard of hogs fed upon acorn mast. The nuts are only plentiful every third or fourth year. I obtain the following from a journal (1862):

Beech Tree Leaves.—The leaves of the beech trees, collected at autumn, in dry weather, form an admirable article for filling beds. The smell is grateful and wholesome; they do not harbor vermin, are very elastic, and may be replenished annually without cost.

Castanea pumila, W Chinquapin. Diffused in upper and lower country; sometimes attaining a height of thirty feet; vicinity of Charleston; St. John's; Newbern. Fl. July.

U. S. Disp. 189. The bark has been used in intermittent fever, but is probably possessed of very little value. The fruit is eatable. The wood is finer grained, more compact, heavier, and even more durable than that of the chestnut, and is admirably adapted for fence-posts—lasting in the ground more than forty years. Farmer's Encyc. See following.

Castanea vesca, L. Chestnut. Florida, and northward. In South Carolina only found in upper districts; one of our noblest trees.

The fruit of the tree and the chinquapin (*C. pumila*) are well known. Eaten either raw or boiled. The roots contain an astringent principle; that of the chinquapin boiled in milk is much used in the diarrhœa of teething children. I would advise a tea made of this to be used extemporaneously in diarrhœa by our soldiers in camp. The bark of both trees contains tannin, and may be used in tanning leather. In Italy, chestnuts are baked as bread, and there and elsewhere are planted as food for hogs.

Wilson, in his Rural Cyc., says that coppices of chestnut afford an excellent produce every ten or twelve years, for hop-poles, hoops, and all kinds of elastic props and handles. "The wood of young chestnuts serves better for gate-posts or for any other purposes which involve constant contact with the ground than any other kind of wood, except yew or larch. It is lauded as a good succedaneum for the coarser kinds of mahogany in the making of furniture." It ranks nearly equal with oak. "Cask staves of chestnut possess the double recommendation of not being liable to shrink and of not imparting a foreign color to liquors which the casks may contain. Dr. Nelson Burgess, of Sumter district, S. C., informs me that at the recommendation of Dr. Jones he has used the decoction of the root and bark of the chinquapin frequently as a substitute for quinine in intermittent and remittent fever, and with decidedly satisfactory results. I mention this hoping that it will be examined by others. I can have no clue to the reasons of its utility, regarding it heretofore simply as an astringent. Hot water is poured over the root and bark, and a large quantity taken during the twenty-four hours. The wood of the chestnut, though brittle, is very durable in weather. I am informed that fence-rails made of it will last over twenty years. The trees can easily be raised from the seed.

Quercus tinctoria. Bartram. Black oak; quercitron oak.

Upper districts; rare in lower; collected in Charleston district; St. John's. Fl. April.

Pe. Mat. Med. and Therap. ii, 194; Am. Med. Record, iii, 363; Barton's Essay to Form. Mat. Med.; Alibert, Nouv. Éléms. de Thérap. i, 93; Mér. and de L. Dict. de M. Méd. v, 590; Edinb. Med. Journal, 72; U. S. Disp. 581; Mich. N. Am. Sylva, i, 91; Journal de Pharm. et de Chim. v, 251; Royle, Mat. Med. 559; Ball. and Gar. Mat. Med. 396; Griffith's Med. Bot. 585; Am. Herbal, 153. The bark, a powerful and valuable astringent, is also possessed of purgative properties, in which respect it has an advantage not met with in the *Q. falcata.* They have both been efficacious in leucorrhœa, amenorrhœa, chronic hysteria, diarrhœa, rheumatism, pulmonary consumption, tabes mesenterica, cynanche tonsillaris, and asthma. Oak-balls produced by these are also powerful astringents, and are employed in many cases requiring such remedies—as in diarrhœa, dysentery, and hemorrhage; also, in mild cases of intermittent fever. The dose of the powder is forty grains. The powder of this, or of the bark, mixed with hog's lard, is a very simple and effectual remedy in painful hemorrhoids, and a decoction is serviceable as a fomentation for prolapsus uteri and ani, and for defluctions from those parts. According to Dr. Cullan, it is applicable in relaxations, or impaired conditions of the mucous membranes, on account of its tonic, constringing effect, and as a gargle in inflammation of the fauces, prolapsus uvulæ, etc. Mr. Lizars has used it with "wonderful success" in the cure of reducible hernia. It is applied topically in mortification, and to ill-conditioned ulcers. Marasmic and scrofulous children are bathed with great advantage in a bath made of the bark. Although this species acts slightly on the bowels, it contains more tannin and gallic acid than the *Q. alba* and *Q. falcata;* hence it is better suited to cases requiring an external astringent. Quercitron is obtained from this and the *Q. falcata* (which see) indiscriminately, and is sent to Europe in large quantities to be employed in dyeing wool and silk of a yellow color.

The bark is a well known and important dyestuff, and is much employed in dyeing wool, silk, and paper-hangings. It is said by Dr. Bancroft, who introduced it into notice, to be equal in power to ten times its weight of woad. With a basis of alumina, a decoction of the bark gives a bright yellow dye; with oxide of tin, it gives a variety of tints from pale lemon to deep orange; and with oxide of iron, it yields a drab color. The cellular integument of the bark is what contains the coloring matter. Wilson's Rural Cyc. "Oak-galls put into a solution of vitriol in water give it a purple color, which as it grows stronger becomes black." Infusions of oak-galls (tannin) are excellent tests of iron. Gallic acid is also yielded by the gall-nuts, and by oak bark. The principal barks which are known to yield it are those of the oak, willow, plum-tree, the poplar, the elm, the mountain ash, the birch, the elder, the sycamore, the beech, and the cherry tree. But it by no means, adds Wilson, follows the proportions of tannin. It is readily, but very slowly obtained from a cold, long-kept, and eventually evaporated decoction of galls, or of the tanniniferous barks. Wilson's Rural Cyc. and medical authors.

All oak bark for the tanner ought at latest to be removed from the tree before the third week of June, "when the sap has begun to rise, and before the leaf is completely developed;" and every ton of it, says Wilson, which is removed after the first of July, is not only impoverished in tannin, but weighs two hundred weight less than if it had been removed before the end of May. Other trees may in England be peeled earlier. The reader interested in procuring barks should read the article Rural Cyc., "Barking." The best methods of collecting and storing are described. The instruments used in collecting bark are a mallet to beat the bark, and a wedge, both made of ash, to insert beneath the loosened bark. The wedge is spatula-shaped. Slight wetting does not injure bark. It is dried in dry, open air, upon supports, so that water will not collect upon it. The bark should be frequently turned. When it is sufficiently dry to avoid

fermentation, it should be carried to a dry-house or shade, or stacked in the same manner as hay—in stacks not so large as to incur the risk of fermentation. In the Farmer's Encyc. the plan of removing bark is described. It is stated that tannic acid most abounds when the buds are opening, and least in winter, and in cold springs. Four or five pounds of good oak bark of average quality are required to form one pound of leather. The bark separates from the tree more easily during spring. See Am. Farmer's Cyclopædia.

The best season for felling timber is undoubtedly midwinter, the next being midsummer, when the sap is chiefly confined to the young shoots, the circumference of the soft wood, and the bark. The worst time for felling timber is the spring, just before the development of the buds, when the tree is fullest of sap. Where much value is attached to the soft or outer wood, felling ought to take place when there is least sap in the tree. In general, all the soft woods, such as the elm, lime, poplar, willow, should be felled during winter; hard woods, like the oak, beech, ash, etc., when the trunks are of large size and valued chiefly for their heart-wood, may be felled at any time. When the bark, however, is to be taken into consideration, as in the oak, the tree should be felled in spring, as then the bark contains four times the quantity of astringent matter to that felled in winter. Brande's Dictionary of Science; Farmer's Encyclopædia.

Wilson's Rural Cyclopædia, article "Charcoal," furnishes a table of the proportions, color, and quality of charcoal furnished by various trees; also methods of preparing it at the iron-works, with the mode of preparing lampblack. The willow, alder, and dogwood are employed for preparing charcoal for the manufacture of gunpowder. See *Salix;* "*Pinus.*"

See article "Leather," in Wilson's Rural Cyc., for mode of preparing the varieties of leather, tanning kidskins for French gloves, etc.; also "*Rhus,*" in this paper.

The editor of the Southern Field and Fireside, April,

1862, states in answer to inquiries "that the bark of the *black poplar* is used in England for tanning, but not, we believe, in this country. It has probably about half the strength of black oak bark. Blackberry briars, roots, and stems washed clean (this it will be observed confirms my own observations) supply a good deal of the tanning principle; and our common broomsedge, or straw, has been largely employed in the manufacture of leather in European nations where timber barks are insufficient to meet the public wants. Sumach is exported largely from Sicily for tanning goat and sheepskins. Oak leaves, fennel, and may-weed abound in tannic acid, and we intend experimenting with the bark of old field pine for making leather. That it contains tan we know; but whether it will be profitable to peel and use it has yet to be determined. Larch is much used in Great Britain, and hemlock at the North."

I see a Treatise on Tanning advertised by S. Hart, bookseller, Charleston, S. C., which I have not examined, but which may furnish more complete information than what is to be obtained from fugitive essays.

From a useful communication in Southern Field and Fireside, Oct. 19, 1861, it is stated that oak bark has sold in the District of Columbia at ten dollars a cord for years; and that "several million dollars worth of sumach (*Rhus*) is annually imported from the south of Europe into the United States for tanning purposes." The *Rhus* grows abundantly in the Confederate States, as well as many other plants containing tannin. I have noticed, in traversing that part of the Dismal Swamp near Suffolk, Va., that the *Rhus* is the most characteristic growth. It could be procured in any amount. The writer of the article just referred to calls attention to the great amount of goatskins and morocco manufactured and exported from France and England, where tannin is scarce, to this country, where the materials for producing are abundant, at least in the Confederate States. I quote from the writer in Southern Field and Fireside as follows, and also refer

the reader to my own examination of the plants growing in St. John's, Berkley, S. C., October, 1861, for the relative amount of tannin in plants. See "*Liquidambar*," in this volume:

"But such is the demand for leather one may well use oak and chestnut bark hewed off at any time in the year. Sumach, fennel, and pine bark are much used in Europe. Whether any of our common pine barks contain tan enough to warrant their use has, we believe, never been tested. Larch bark is much used in Scotland, although only half the strength of oak. Monteath, of Stirling, applied chemical tests to the infusion of different barks with the following results: Oak (coppice) contains most tannic acid; ash and hornbeam next; Spanish chestnut third; willow fourth; birch, beech, and larch fifth; spruce and silver firs sixth; mountain ash and broom seventh; and next Scottish pine, bramble or briars, laburnum, and the sawdust of oak timber." My examinations were made before I saw this paper.

Dr. Daniel Lee in the papers published in the Southern Field and Fireside, from which I have drawn largely, earnestly advises us to be more economical with regard to our supply of barks for tanning. "It is poor economy," he says, "for the South to destroy nearly all of its valuable tan-bark in clearing oak land, cutting rail timber and firewood, and thereby deprive our children and grandchildren of the power to manufacture their own leather. The time has come when this error must be corrected, or serious injury will be the consequence. To send a million dollars worth of hides to the North, have them tanned, and the leather made into shoes, boots, saddles, and harness for Southern consumption, is to pay about eight or nine million dollars for the support of that Northern economy which never wastes the bark that grows on oak or hemlock trees, and that industry which turns this bark into gold." I know this criticism is partly just; still, the planter at the South cannot often turn to the storing away or sale of all the oak or other bark on his place when he is compelled to

clear new land, and can scarcely accomplish that properly; whereas at the North the farmer is compelled to every expedient to add to his resources.

I have endeavored, in the examination made in St. John's, Berkley, S. C., November, 1862, to show that the leaves of many of our native trees—such as the sweet gum, myrtle, etc., are rich in tannin, and being easily procured may be substituted for barks, which are difficult to prepare. Tanners in the State of New York, Dr. Lee states, save tan-bark enough to manufacture three times as much leather as the four millions of people in that state consume. "Leather is largely exported from New York and Massachusetts (which is a land of shoemakers) to England, the Southern states, and the great prairie West." He condemns "the habit of felling oak trees when the bark will not peel." See "*Quercus*," "*Rhus*," "*Myrica*," and "*Liquidambar*," for notice of plants suitable for tanning leather; also Wilson's Rural Cyc., art. "Currying," for method of preparing and dressing leather, and Ure's Dictionary of Arts.

"*Method of tanning.*—For doing a small business hot water and hot ooze may be best run upon the bark to extract all its tannic acid in a short time; but in a large way either a copper heater should pass through the leech holding bark, or it should be boiled by steam. A copper pan is sometimes used, set on an arch, for heating ooze. A mill for working hides operates precisely like a fulling-mill in scouring and fulling cloth. When dry and weighty, Spanish hides are tanned. Hide-mills have heavy hammers, which are elevated eight or ten inches by a revolving wheel, and fall with an oblique stroke on the hides, that causes them to turn like cloth in a fulling-mill. Any horizontal staff will work a hide-mill, and a horse-power will drive the shaft. Our friend, Prof. Rutherford, has constructed a horse-power for fifty dollars on his farm (which joins that of the writer), that would drive a hide-mill as easily as it now thrashes wheat, and cuts hay and straw for horses. As this is a cheap and valuable power for farm

use, it has been our purpose to describe it, which we shall yet do.

"Any mechanic, by seeing the model of a hide-mill, could easily make one. It needs no cast iron double crank like a fulling-mill. The whole affair can be made of wood. Our tanning in the South is many years behind the progress of the age." The reader interested in this subject may consult with advantage Ure's Dictionary of Arts and Manufactures; also an excellent article on tanning and leather, in Nicholson's Encyclopædia.

I am induced to insert, in connection with the subject of materials for tanning, a communication entire upon the subject from the pen of Dr. Daniel Lee, in the Southern Field and Fireside, Nov. 30, 1861. It contains practical instruction on the subject of manufacture of leather on a small scale by farmers and planters:

"It will be better for several farmers, having from five to ten hides each, to unite in the purchase of a bark-mill for grinding tan-bark, and in constructing a few vats for their common use, than for one to be at the whole expense for so small a business as his own alone. The most primitive way of tanning is in troughs dug out of large trees like pine and poplar; but molasses and bacon hogsheads will form the cheapest tan-vats for the farmer's use. Dig out the earth two-thirds the depth of the hogsheads; pound moist clay over the bottom on which the hogsheads are to stand. Three or four will do for the tanning part of leather-making. Let them not come within six inches of each other, so that moist clay may be pounded closely around each hogshead to within three inches of the top. If bark cannot be ground, it should be broken or cut fine with an axe, so as to fill two of the hogsheads. Heat clear spring or rain-water boiling hot in large pots or kettles, till the bark in both hogsheads is covered with it. Let the bark steep and soak a week or more, while the raw hides are prepared for the ooze and tanning. One hogshead will do for this, but two are better. They ought to stand some yards from the bark-vats, because lime spattering into the

ooze injures it. Surround these with clay like the hogsheads used for tanning.

"After the horns, tail, and dew-claws are removed from a green hide, it is split into two halves or sides, from the tail to the nose on the pate. If the hide is dry, it must soak and soften first. After it is split it goes upon the beam, and the operative scrapes and tears off all the flesh, and part of the fascia or membrane which covers the flesh side of every skin. It is now ready for the lime. A half bushel of recently slaked lime, or some less of quick lime, will do for a hogshead nearly full of water. The lime and water should be well stirred with a clean hoe or "plunge" before putting sides or skins into the same. They should be often moved about in the lime-water by a lever some seven or eight feet long, and hauled out once a day with an iron or wooden hook such as tanners use. As soon as the hair will slip, sides should be worked over the beam and rinsed in the soak, or water hogshead, to remove the hair and all the lime. The hogshead used as a soak, washed clean, is now to serve as a hen-dung vat or bait. It ferments, and is ripe for use in one or two days, after soaking in a half hogshead or more of water. Much pains and care are used in working sides and skins out of the bait, as they go from this into the tan ooze. They will soon taint and spoil in warm weather. Worked and washed clean, the sides and skins are next handled two or three times a day in tan ooze until they are evenly colored, and get a handsome, fine grain. The handling is done in this wise: Place three or four pieces of plank four feet long down as a platform, so as to slope over the hogshead, and let ooze from the leather, when lifted out of it upon the plank, run back into the hogshead, and not waste upon the ground. Short pieces of scantling or sticks of clean wood lie on three sides of the plank, over which the edges of the two sides laid down extend, and thus form a sort of trough open only at the end that lies over the edge of the hogshead. All the sides are drawn up separate from the liquor with a hook, and spread by hand on the platform,

and are thrown back into the ooze again. If the latter is weak, it is half or more pumped out, and fresh, strong ooze is pumped in. The two hogsheads of bark, with boiling hot water, will keep up the strength as fast as ten or twelve sides can possibly absorb it, after starting with two hogsheads of good ooze. You cannot heat old ooze in an iron vessel, as it would spoil it; but you may, perhaps, beg or borrow a copper still, in which tan ooze may be heated without the least injury to the liquor or the still. The heated ooze is put on the bark, as it is much better than water, where it is allowed to become about as cool as the atmosphere.

"As the tanning advances, skins and hides require less handling. We should hang them across sticks an inch or less in diameter, in and under the ooze. The ends of these sticks or rods should rest on a light frame in the hogshead, and four inches or more below the top. Allowing two inches for each stick and side, fifteen sides would occupy thirty inches in width in the hogshead. Batts and butts hang down near the bottom of the hogshead, where the ooze is strongest. A small hand-pump should be put frequently by the side of the leather and of the hogshead, to lift the ooze at the bottom to the top. Sides are handled a week or two before suspending them separately in ooze.

"As pumping is easier, and less wasteful than dipping, we will state the way in which a cheap and good pump can be made: Its whole length should be some six feet, and the material, plank, not over an inch thick. The open space on the inside for the ascent of ooze or water should be about three inches square. Two strips of plank three inches wide, and two five inches, the latter lying on the former on both sides, will form an aperture in the centre of three inches square. The plank ought to be closely jointed, and either painted or covered with tar or melted pitch to make all the joints water-tight. Of course the nailing should be close and perfect. A box of half-inch plank comes up two inches inside from the bottom of the pump for the leather valve to rest upon.

"One side of the valve is very simple, but not easy to describe. Imagine a funnel made of thin, flanky, sole-leather, four inches in diameter across the top, and as many deep down to the neck, and that its centre is nailed or tied fast to a rod that is to serve as a piston in the pump. The weight of water or other liquid to be raised in pumping can set this pliable leather cup to adapt itself to the square shape of the aperture in the pump; and to prevent this cup or funnel falling back in lifting ooze or water, three narrow strips of leather, sewed to the top of the funnel on three sides (one on each), are nailed with small nails to the piston-rod above, say six inches from the funnel. A small but strong wooden pin passes through the end of the rod which, held in the hand, enables one to lift easily all the liquid in the pump. The discharge from the pump is made in the usual way, a foot or more below the top of it. Any one who can use a plane can make a pump of this kind take ooze from the bottom of one vat, tub, or hogshead filled with bark or leather, and put it expeditiously into another, where all stand on a level, or nearly so. A thin case keeps the tan-bark or leather from filling the little space required by the pump, which is put into the vat or hogshead, and taken out as often as needed. Any blacksmith can make the beaming-knives used by tanners, but not those used by curriers in finishing leather. The former are curved, and often have small teeth to tear up the tough membrane under the skin. All tan-bark should be clean and dry, for dirt and earth blacken leather. Careless persons often get clay and mud into tan-vats, than which nothing is more injurious. Few arts demand equal neatness in their operatives. With the most improved apparatus and good bark, the labor of tanning is small. An expert will work one hundred grown hides into the bark or ooze in a month, for which we generally paid twenty dollars; and the labor of tanning two hundred sides was about the same after they came to the bark.

"If a farmer can get his hides tanned and curried for half of the leather they will make, it is probably better than

to attempt to tan them himself. Let him improve his pastures by cultivating the best grasses, and raise more fat cattle for home consumption, and thus have three or four hides for the tanner where he has one now. This will call first-class tanneries into existence that will give a pound of good sole-leather for a pound of dry hide, or nearly that. Every farmer ought to spare all the tan-bark he can; for we speak advisedly when we say that the Confederate States are even now short of oak bark if they are to manufacture all the leather which they consume in saddles, bridles, harness, saddle-bags, buggy, and carriage trimmings, caps, hat-linings, book-bindings, shoes, and boots. It has been the misfortune of the cotton states to underrate all other industries but that of producing their great staple. Hence the scarcity of good mechanics and artisans. Hence we make no effort to diversify our agriculture, and thereby meet many public wants, while resting our land from the scourge of eternal ploughing. That system of husbandry which accumulates the elements of crops and fertility in every acre cultivated, is still a myth to most planters. Southern nationality will expose, and happily correct many errors. We shall learn to make as much cotton and corn on two acres as we now do on six, and at the same time we shall produce tenfold more of the necessaries and comforts of civilized life. Our dependence on foreign industry and skill for so much of what we consume encourages the world to believe that our subjugation is only a question of time. Since the mechanical trades are necessary to our happiness, we should encourage our sons to become scientific mechanics, as well as farmers, lawyers, doctors, and priests, and soldiers."

On account of the importance of the subject I insert here the following directions for "*Tanning on the Plantations*," by T. Affleck, from the Am. Agriculturist, also republished in the Southern Cultivator, vol. i, p. 198, and the paper by J. S. Whitten, and one in vol. vi, p. 177:

"Tanning leather for the use of the plantation is an item of good management that should not be overlooked by any

planter. Nor would it be as much overlooked as it is if the simplicity of the process was generally known—that process, I mean, that will suffice for making leather for home use. The *tanner* by profession, in order to prepare an article that will command a good price in market, and have a merchantable appearance, puts the hides and skins through a greater number of manipulations, and that he may work to better advantage, has his arrangements on a more extensive scale.

"The vats, tools, and implements really needed are few and simple. Four *vats* will generally be found all-sufficient; one for a *pool* of fresh water, and for *baiting;* one for *liming;* another for *coloring;* and a fourth for *tanning.* The best size, in the clear, is seven feet long, four and a half feet wide, and five feet deep. They should be placed so as to be easily and conveniently filled with water from a spring, running stream, or cistern. Dig the holes nine feet by six and a half and six; if the foundation is clay, the depth need not be over five feet. Form a stiff bed of *clay mortar* in the bottom on which to lay the floor, and on it erect the sides and ends of the vat, of plank of almost any kind, sufficiently thick to resist the pressure from without—two inches will be thick enough. When this is done, and the whole nailed fast, fill in the vacant space all round with *well tempered* clay mortar, ramming it effectually. It is on this, and not the planks, that dependence is placed for rendering the vat perfect. When well made a vat will be good for a long lifetime—the *ooze* preventing the decay of any but the top round of plank. Such a vat will hold fifteen large beef hides (thirty sides), besides a number of small skins.

"The material used for tanning is the bark of the red or black oak, stripped when the sap flows in the spring, stacked and dried, of which about four pounds are supposed to be necessary to produce one pound of leather. There is an article occasionally used called "catechu," which is an extract made from the wood of a mimosa tree, a native of India, half a pound of which answers the same purpose.

Galls, willow bark, the bark of the Spanish chestnut, and common elm, as also sumach, are all used by the tanner. It has been recently found that the root of the palmetto answers an equally good purpose with the best oak bark.

"Bark has to be ground as wanted; or if the quantity needed is small, and it is not thought advisable to incur the expense of a bark-mill (from $10 to $18), it may be pounded in a large mortar, or beat up on a block. It will require one-third more of pounded than of ground bark to afford equally strong ooze, which is the infusion of bark.

"The principal tools requisite are a flushing-knife, currier's knife, a brush like a stiff horse-brush, and a fleshing-beam. The fleshing-beam is made by splitting in two a hard wood stick of about a foot in diameter; inserting two stout legs, some thirty inches long, in one end on the split side, so that the other end rests on the ground, with the round side up, the elevated end being high enough to reach the workman's waist. A fleshing-knife may be made by bending an old drawing-knife to suit the *round* of the fleshing-beam.

"The skins of bulls, oxen, cows, and horses are called *hides;* those of calves, deer, sheep, etc., are known as *skins.*

"Fresh and dried hides receive the same treatment, except in the washing process. Those that are salted and dry (and no hide should be dried with less than from two to four quarts of salt being rubbed on the flesh side—dried without salt, it is extremely difficult to soften them—) require to be steeped, beaten, and rubbed several times alternately, to bring them to a condition sufficiently soft for tanning.

"Green or fresh hides must be soaked in pure water from twelve to twenty-four hours, to extract all the blood, etc., and soften the extraneous, fleshy matter, which must then be removed—throwing one hide at a time on the fleshing-beam, grain or hair side down, and scraping or shaving it off with the fleshing-knife, which must be somewhat dull or the skin is apt to be cut. They are then put in the liming-vat, which is supplied with strong lime-water

by filling the vat a little over half full of water, and adding thereto four bushels of unslaked (or of air-slaked) lime, or at the rate of two-thirds of a bushel of lime to the barrel of water. This will suffice for fifteen hides; each time that they are removed and a fresh lot of hides put in, add another bushel of lime, which will keep up the strength for a twelvemonth. Before using stir the lime well up, and while it is thus mixed with the water put in the hides evenly, so that the lime will settle on every part of them. They are to remain here from ten to fifteen days, or for three or four days after the hair will rub off with the finger completely and with ease. While in the liming-vat they must be moved up and down every other morning, to expose them to the air, and to the equal action of the lime. Being now ready for unhairing, cut each hide in two by slitting them along the centre of the back with a knife, forming them into *sides*. Throw ten or twelve of these sides on the fleshing-beam, and strip the hair off with the knife; and as they are unhaired, throw each one into the vat of fresh water to bait or soak. When the lot of sides and skins in hand have been all unhaired and thoroughly washed, throw them again, and at once, on the fleshing-beam, with the grain or hair side up, and work them over (rub and press them) with the knife until all the gummy or mucilaginous matter is worked out. This should be repeated two or three times during ten or twelve days, being each time baited anew in fresh water. And this working over must only be done when the sides feel soft and smooth to the touch; as they will at times, from some unexplained cause, feel rough, at which time they must not be worked over. While they are thus boiling they must not be neglected, or they will soon spoil. Tanners are in the practice of adding one thousandth part of sulphuric acid (oil of vitriol) to the last bait, which has the effect of swelling the pores and distending the fibres, and thus rendering the skins more susceptible to the action of the ooze. Forty-eight hours generally suffices for this last baiting.

"In the meantime, some good, strong ooze should be pre-

pared for the first tanning process, called *coloring.* Fill a vat a little more than half full of water, and add bark, in the proportion of one and one-half bushels of ground, or two bushels of pounded bark, to the barrel of water, which will bring the vat up to about two-thirds full. When the bark has soaked from four to five days, the sides are put in, and allowed to remain fifteen days; during which they must be *once* well and carefully fleshed and worked over, and must be drawn up and down every morning, for the first week at least, and the bark well plunged or stirred up, to have them color evenly.

"After this, the vat being now two-thirds full of this same ooze, after drawing out the hides lay a good coating of fresh bark, of say an inch thick, on top of the water, on which it will float; lay on this a side, spread out evenly, and if it has to be lapped over in any part lay on more bark until it is all well coated, taking care to place those hides at the bottom of the vat now that were at the top last time. On this side lay an inch-coating of bark, and on that another side, and so on, with alternate layers of bark, until the vat is full, or the sides all laid away.

"In this, which is called the first bark, the sides must lie four weeks. They are then drawn out, and the spent bark taken out with a skimmer or drainer. The sides are then replaced as before, with alternate layers of fresh bark, in the same ooze, which has acquired some additional strength, notwithstanding the amount of tannin and extractive matter contained in the bark that has become intimately combined with the animal fibre of the hide. In this second bark they remain six weeks undisturbed, when they receive a third bark in the same way, in which they are left another six or eight weeks. Three barks will suffice to tan deer, hog, calf, and other small skins; four barks will make good sole-leather, but five are preferable.

"The tanning process being completed, sole-leather is taken out of the vat, rinsed effectually, and dried in the shade, hanging the sides up by two of their corners to joists, where they may remain until wanted. Those sides

intended for upper and harness leather (which are those of cows, etc.—the largest and thickest bullock hides being used for sole-leather), as also deer, hog, and other small skins, being thoroughly rinsed, are spread out on a strong table, with the grain or hair side up, and scoured with a stiff brush, like a very stiff horse-brush, occasionally throwing on pure water, until all the ooze is scoured out. Tanners use the edge of a stone, made smooth, to assist in rubbing out the ooze, and all the water that can possibly be rubbed out. They also use what they call a *slicker*, being a dull edge of copper of about six or seven inches long set in a piece of wood, to serve as a handle.

"After they are all served thus, and rubbed as dry as possible, the table is cleaned off, and the skins thrown back upon it grain side up, and are rubbed with tanner's oil (codfish oil) as long as the leather will receive it. Harness leather must be completely saturated. As they are oiled fold them up and lay them aside. When they are all gone over lay one on the table at a time, flesh side up, and with a rag rub on all the dubbing that the leather will absorb. Thin hides require but a small quantity; harness leather must have a heavy coating.

"Dubbing, which consists of equal parts of tar and tallow, melted together, and well mixed, must be made the day previous to being used. Lard may be used in place of tallow, but will require a lesser proportion of it. Each side of leather is then hung up by two corners to joists, there to remain until perfectly dry, or until wanted.

"If iron or steel touches a hide during the process of tanning when in the least wet, or even moist, it will discolor it, forming an indelible black mark.

"To blacken harness or other leather, take the skin when completely dried, and if any greasy spots appear, showing that more oil or dubbing has been applied than the leather could absorb, wet the spots with a little strong ooze, and scrub them out with the brush. Then apply a coat of copperas (sulphate of iron) dissolved in ooze, until the leather has a good color all over. After this, when

dry, put on another good coat of oil. The leather may then be smoothed off with a rounding edge of polished steel, or glass, or stone."

The following is from Southern Cultivator:

"Having tanned my hides for a number of years, and believing it to my interest, I suppose it will be profitable to others who have many raw hides.

"I have succeeded well, and think my leather firmer, and more valuable for negro shoes and the coarse harness on my farm than tan-yard leather. My plan is a much cheaper one than Mr. Affleck's.

"I tan from ten to fifteen hides a year, of various sizes. I have two vats five by seven feet, four feet deep, sunk in the ground near a falling branch, so constructed at the bottom that I can draw a plug and wash and empty them. I begin in March; soak my hides ten days in running water. Two or three times I take them out and give them a good rubbing or washing. They are then ready for the lime, as we call it. I then put them in one of my vats, and divide equally among them from three and one-half to five bushels of good ashes, and two or three quarts of lime, and cover the whole in water. The lye had better be strong, and if you err, err on that side. Every few days I take them up, or rather stir them up, and mix them again, so that all parts shall be equally acted on by the lye and the atmosphere, in the top and the bottom of the vat. If your lye is right, in ten or twelve days your hides will be thickened to two or three times their first thickness—feel more like a sheet of jelly than anything else—and the hair will slip easily. Then slip off the hair, and with a drawing-knife or a currying-knife scrape off the loose flesh and cellular matter on the other side, and as much of the lye as you can, without bruising the hide; and then put them back into fresh and clean water. Every other day take them up and give them a good rubbing or scouring, for ten days. They are then ready for the bark; and by that time you can slip the bark off your oak trees, and have it

ready for the hides. I never grind my bark. I take it from the tree, and with a drawing-knife take off the rough on the outside, and just beat it enough to cause it to lie flat in the vat. In my other vat I do all my tanning, and commence with a layer of bark, then of leather, and so on; and so lay it in the vat that every part of each side of the leather shall lie against bark; and when I am done, I immerse this entirely in water.

"The first year you had better boil an ooze in kettles or pots, and use that instead of water, and afterward always preserve your old ooze to use next year instead of water. I let this lie until the first of August, and put in a second bark precisely as the first, and let it lie until some time in October or November, when my leather is fully tanned, if these directions have been followed. When the leather is well tanned it presents a yellow, spongy appearance, through and through; otherwise you will see a white or hard streak in the centre. When I take it up I scour the ooze well out of all. That I intend for sole-leather I straighten and dry; that for upper leather I wash well, then grease well with the cheapest oil I have, and after drying eight or ten days I moisten it, curry off the spongy, soft part from the flesh side, and when moist, beat it or break it over some rough surface until it is comparatively soft, and the grain side is all puckered up, or wrinkled into small wrinkles. Then, when my leather is thoroughly dried and shrunk, it is fit for use."

Quercus falcata. Mx. Spanish oak. According to Elliot, common on the sea-coast; collected but sparingly in St. John's; Richland; grows also in Georgia; vicinity of Charleston, Bachman; Newbern.

Chap. Therap. and Mat. Med. ii, 493; U. S. Disp. 581; Bart. Essay on the M. Med.; Alibert, Nouv. Éléms. de Thérap. 193; Phil. Med. Mus. 11; Mér. and de L. Dict. de M. Méd. v, 586; Lind. Nat. Syst. Bot. 170. This is possessed of the astringent qualities characterizing the genus; it has not, however, the purgative property found

in the *Q. tinctoria.* It is employed as an astringent wash for gangrene. A decoction is administered with great success in dysentery, pulmonary, and uterine hemorrhage, and some have said, in intermittent fever. See *Q. tinctoria* and *alba.* In domestic practice, where an easily obtained and efficient astringent is required, this, and the more common species, the *Q. rubra*, are of no little value. They are used to a large extent on the plantations in South Carolina.

Quercus alba, L. White oak. Diffused; St. John's; vicinity of Charleston; Newbern. Fl. May.

U. S. Disp. 582; Royle, Mat. Med. 659; Griffth, Med. Bot. 586. The bark is officinal, and is generally used in similar cases with the above, with the exceptions before mentioned. By some it is preferred to the others on account of its not acting on the bowels. The decoction is sometimes used as an injection in leucorrhœa and gonorrhœa. The bark contains tannin, gallic acid, and bitter extractive, the former predominating. Bark officinal. Young bark preferable. The whiter bark, and the delicate and finely lobed leaves, with the general neat appearance of the tree, serve to distinguish this from the other varieties of the oak, than which it is more acceptable to the stomach. All, however, are valuable for external application. Good collected at all seasons. Astringent, somewhat tonic. Powder—dose, from one half-drachm to one drachm. Extract—dose, half that of the powder. Decoction—bark bruised, one ounce; water, three half-pints; boil to one pint. Dose, one wineglassful. This is one of the most valuable of our forest trees, and it is largely employed for manufacturing purposes, and in the domestic economy of the plantations in the Confederate States. The wood is hard and durable. It is employed, when stripped, in making plantation baskets, and chair bottoms.

The following table is the result of the experiments of Barlow upon the "Absolute strength of different kinds of wood drawn in the direction of their fibres." Wilson's

Rural Cyc. on the strength of materials may be consulted. Article from Renwick's Elements of Mechanics:

Boxwood ..	...20,000 lbs.	English Oak.	10,000 lbs.
Ash.	.17,000	Am. White Pine. ..	9,900
Teak. . ..	...15,000	Pear Tree	9,800
Norway Fir ...	.12,000	Mahogany	800
Beech ...	...11,000	Elm	5,800
Canada Fir... ..	.11,000	Cast-steel was	.140,000
Russia Fir	10,700	And Gold.	80,000
Pitch Pine... ..	.10,400		

"Absolute cohesive strength of wood drawn in a direction at right angles to the fibres:"

Teak ..	.818 lbs.	Canada Oak...	.588 lbs.
Am. White Pine ..	757	Pitch Pine.	...588
Norway Fir.	.648	Elm ..	.509
Beech	.615	Ash ..	359
English Oak.	.598		

The following table gives the "respective strength of various substances:"

Metals.		*Wood.*	
Wrought-iron, Swedish	.22,000 lbs.	Teak	.4,900 lbs.
" English.	.18,000	Ash.	.4,050
Cast-iron .	.16,000	Canada Oak.. ..	..3,500
		English Oak ..	.3,350
		Pitch Pine...	3,250
		Beech. ..	3,100
		Norway Fir.	.2,950
		Am. White Pine. ..	.2,200
		Elm ..	1,013

English oak resisted a greater amount of pressure, by Rennie's experiments, than many other kinds of wood; three times as much as elm, for example. See, also, article "Timber," in Rural Cyc., for method of preserving, relative strength, etc. In England the shipwright considers that three years are required thoroughly to season timber. Timber is best preserved by immersion in water for six months, and the exposure to shade for another six months. The white oak cleaves and splits readily, and is used in making plantation baskets. I have seen it used in place of cane in making chair seats. The white oak lasts longer in weather than hickory.

White Oak Baling.—The Columbia Guardian notices a bale of cotton, in which white oak slats, basket fashion, take the place of gunny bagging, and hoops of the same wood take the place of rope. This device is the work of H N. Carter, of Laurens, who states that with machinery for cutting the slats, two hands can get out enough for one bale in twenty minutes.

I will introduce under the genera "*Quercus*" and "*Carya*" what I have thought useful on the subject of ashes, pearlashes, potash, soap, etc. Information is required on these invaluable substances. For processes, see Ure's Dictionary of Arts. For "soda," see "*Salsola*," in this paper.

"*A cement for cisterns*, as hard as marble, and impenetrable by water forever," is made of wood ashes two parts, clay three parts, sand one part, mixed with oil—all ingredients easily obtained.

"Concentrated Lye" is a very pure preparation of caustic soda, or soda ash purified.

The following is the method of making hard soap with this substance, which is preferable to potash or any of its preparations; it is also very economical: "One half-box of concentrated lye, four pounds of grease, one pound of rosin, five gallons of water. Boil all together until the soap is made—a point easily determined; then add a half pint of salt dissolved in a quart of water, boil a few minutes longer, and pour off into tubs to harden. This will yield about thirty pounds of excellent hard soap, at a cost of about two and a half cents per pound."

The following general deduction, which is instructive, is made in Wilson's Rural Cyclopædia, art. "Ashes": "Trees in a general way, make a plentiful yield of potash, somewhat in the degree of their hardness, their heaviness, and the closeness of their texture; and the chief of them may upon this principle be distributed into four classes—first, the oak, the ash, the yew, the beech, the chestnut, the pear, the crab, the blackthorn and the broom; second, the elm, maple, hornbeam, and white-thorn; third, the pines and

firs; and fourth, the birch, alder, poplar, hazel, and willow. When six loads of the ashes of the first class are sufficient for an acre of land, ten or twelve loads of the ashes of the fourth class may be required." It will thus be seen what room there is for selection in using trees for ashes or for the production of potash. For further information on potash, ashes, soaps, consult "*Carya*," hickory, in this paper.

Table of mean results of experiments of Messrs. Kerwan, Vauquelin, and Pertues, upon ten thousand parts of each plant—amount of potash in each—(Chaptal):

Elm ..	...39	of potash.	Fern ..	62	of potash.
Oak ..	.. .15	"	Cow Thistle	196	"
Beech. ..	.12	"	Wormwood.	 730	"
Vine ..	.55	"	Vetches.	.275	"
Poplar	7	"	Beans ..	.200	"
Thistles	...53	"	Fumitory	.... .890	"

In selecting plants to burn for potash, which can be done on any plantation, those which are thus seen to yield most should be chosen. "Grasses, leaves, the stalks of French beans, of peas, melons, gourds, cabbages, artichokes, potatoes, maize, and garget, are very rich in this alkali." Thistles, nettles, broom-heath, brambles, ferns, should all be collected. The fumitory and wormwood (exceedingly rich in potash) are both grown in the Confederate States. The plants are first dried and then burned, and the ashes leached, which should be repeated. Hot water is better than cold. The potash can easily be extracted from the lye by evaporation. "The process," says Chaptal, "may be commenced in a copper boiler, into which a very fine stream of the lye should flow to replace that which evaporates; when the liquor has acquired the consistency of honey it should be put into iron boilers to complete the operation. As the substance thickens, care must be taken to remove that portion of it which adheres to the sides, and to stir the whole carefully with iron spatulas. When the substance congeals and becomes solid upon being exposed to the air, it is poured into casks, and thrown into

commerce, under the name of salts. The whole process is simple, and may be conducted upon our farms without any difficulty." Pearlash may be procured from the potash by calcination. See treatises on the arts.

The following observations may be found useful to the soap manufacturer, even if he exists in the person of a planter or farmer, which I quote from Thornton's Family Herbal: In the large manufactories the lye for making soap should be made no stronger than to float a new laid egg when the workmen begin to form the mixture. The oil or tallow is first boiled with a weak lye until the whole is formed into a saponaceous compound. It is then kept boiling with a stronger lye until it acquires a considerable consistence, and seems to be separating from the fluid below. This separation is a very material part of the operation, and to effect it completely a quantity of common salt is added; the materials are continually boiled for three or four hours, and then the fire is withdrawn. The soap will now be found united at the top of the liquor, or what is called the waste lye, which is of no further use, and is therefore drawn off. The soap is now melted for the last time with a lye, or even with water. It is then allowed to cool, and afterward cast into wooden frames. The last melting is important, as giving compactness. A solution of sulphate of iron will mottle soap by dispersing it before the soap hardens throughout the mass.

A most economical mode of washing, which has been employed by farmers, which *reduces the labor of days to that of a few hours*, might be adopted in our armies. The washing of an entire regiment, when in garrison or in cities, might be done systematically and collectively with far less exposure and loss of time. I obtain the method from some of the journals:

On the night preceding the day intended to be set apart for washing, the clothes, white and colored, coarse and fine, are put in tubs of clear water, where they remain all night. A large size vessel, the larger the better, is half filled with water, which is raised to the boiling point. To one con-

taining sixty gallons put two teaspoonfuls of sal soda, one quart of soft soap, and one quart of lime-water, made by pouring three gallons of water on one quart of lime the night previous, so that it may have had time to settle, and in proportion if smaller vessels are used; stir the water and ingredients well together, when the clothes are put in, and boiled rapidly for an hour; they are then taken out and rinsed well. The same lime-water may be kept until it is all consumed. The receipt for making the soap is as follows: The ingredients for one hundred pounds do not cost more than one dollar and fifty cents. Take six pounds of potash, four pounds of lard, one-fourth pound of rosin; beat up the rosin, mix all together well, and set aside for five days; then put the whole in a ten gallon cask of warm water, and stir twice a day for ten days; at the expiration of which time, or sooner, you will have one hundred pounds of excellent soap. Strong lye-water or concentrated lye may perhaps take the place of the potash. A gill of alcohol added to a gallon of soft soap, applied to clothes in the usual way, and soaked several hours before washing, furnishes an economical method.

Quercus rubra. Red oak. Diffused; grows in great abundance; St. John's; Charleston; Newbern. Fl. April.

U. S. Disp.; Griffith, Med. Bot. 587. Employed, like the others, as an astringent. It is easily obtained, and conveniently prescribed. I have myself found the bark of the tree of some service among the negroes, in several cases where a tonic astringent injection was required, using it in one of prolapsus uteri, where the organ became chafed and painful from exposure. The decoction of the bark, with sulphate of copper, is employed on the plantations to dye woollens of a green or black color, and for tanning leather. Hickory bark, with copperas, furnishes an olive color; maple gives a purple dye, the tea leaf (*Hopea tinctoria*) a yellow, and white oak a brown. Walnut leaves or roots, without copperas, repeatedly boiled, yield a black dye. Blacksmiths' dust may be used in place of copperas.

The wood is not so durable as that of the *Q. alba*, but it is much used for domestic purposes.

Quercus montana, Willd. Rocky soils in the Alleghany mountains of South Carolina. Used as a substitute for the above.

Quercus virens, Aiton. Live-oak. Grows abundantly on the sea-coast, for the space of forty miles from the ocean; Newbern. Fl. June.

U. S. Disp. 581; Eberle, Mat. Med. i, 376. This tree is of quick growth, and attains a large size in South Carolina. Its great value for manufacturing purposes, shipbuilding, etc., is well known. It is often exported for these purposes, to great advantage. Its branches extend out to some distance, and it affords one of our most venerable, magnificent, and ornamental shade trees, suited for avenues. The acorns are edible.

Density of Wood. — I introduce the following under *Quercus virens*. Count Chaptal, in his Chemistry applied to Agriculture, makes the following remarks: "Soil, exposure, climate, and season modify in a remarkable manner the fibre of vegetables of the same kind. Vegetables raised in a dry and arid soil have a much harder and more compact texture than those of the same kind raised in a moist and rich soil; they have more perfume, contain a greater quantity of volatile oil, are decomposed with more difficulty, and during the combustion give out a much more intense heat. Every one knows that thickets having a southern exposure yield better fuel than those which lie toward the north; the wood is more solid, and after having been cut, it will resist for a longer time the action of air and water. This fact was observed by Pliny, in regard to the woods of the Appenines."

The difference between the hardness of trees growing in swamps and highlands is, I believe, referred to by Boussingault. The locality and the season of the year should have an influence upon the tree, upon its structure, and

secretions, and they should be considered, in reference to the growth of timber for ships, implements, etc. The best time for cutting wood is in the end of the winter, when the texture is hardened and condensed by the cold. Boussingault, in his work on Scientific Agriculture, describes a French method of preserving timber, superior to the Kyanized, by the absorption of the salts of iron. I would refer the curious reader to a paper, giving a most remarkable account of the enormous size and height of the trees, and the vegetable wonders of California, in Patent Office Reports, p. 4, 1851, by Wm. A. Williams. Trees sixty-eight feet in circumference, and three hundred and eighty feet in height, without a branch for two hundred and sixty feet; vegetables relatively large. See Boussingault's work for similar statements; also, paper in Patent Office Reports on Agriculture, p. 655, 1851, by Thomas Eubank, Commissioner, containing extracts from writings of M. M. Naudin and Lecoq (report to the French Academy), on the taming of plants by cultivation; they "tamed every individual species of the fierce family of thistles," converting them into a savory vegetable.

It is well known, says a writer in the Patent Office Reports, 1852, p. 257, that the most valuable timber is that which has attained its growth with most light and air. The wagon-maker takes care to combine toughness and durability by selecting his wood from trees of second growth, or from trees of first growth that from infancy have stood alone, or far apart. I have ascertained, in conversation with machinists and wood-cutters, that they separate many species of useful trees into two varieties, and make careful selection in cutting for the shop.

Quercus prinos, L. Vicinity of Charleston; Newbern. This may be used medicinally as a substitute for the *Q. alba*.

Quercus suber. Cork tree. Exotic.

The Patent Office has distributed for years past seeds

and plants of the cork tree. See Reports, 1854, p. 32, for mode of culture and gathering of cork; and article on "Properties and Uses of Cork Tree." Patent Office Reports, 1858, p. 335.

Quercus.

For method of raising acorn-bearing oaks, for feeding of hogs, varieties, etc., see Wilson's Rural Cyclop., art. "Acorn," "Oak." In some portions of England hogs are raised almost entirely upon acorns, and with but a limited supply of grain just before killing. "The farmers of Gloucestershire bestow nearly as much care upon the fruit of their oak trees as upon the produce of their orchards; they seldom sell their acorns, yet usually estimate their value at from 1s. 6d. to 2s. per bushel," etc. Wilson. See also Boutcher's "thoroughly practical" Treatise on Forest Trees. See Boussingault's Agricultural Chemistry, and Wilson's Rural Cyc., for method of preserving timber.

BETULACEÆ. (*The Birch Tribe.*)

Bark astringent; sometimes employed as a febrifuge.

Betula lenta, L. Sweet birch; cherry birch; mountain mahogany. Mountain ridges of South Carolina.

U. S. Disp. 1233. The bark and leaves possess a very aromatic flavor. An infusion of them is useful as an agreeable, gently stimulant, and diaphoretic drink. The oil, obtained by distillation from the bark, has been shown by Proctor to be similar to that of the *Gaultheria procumbens*. (See that plant.) It also affords a saccharine liquor. Am. Journal Pharm. xv, 243; Ell. Bot. ii, 617 The wood, possessing a fine grain, which is susceptible of a beautiful polish, is much used by cabinet-makers. It would be adapted to the fine work on railroad cars. Is the handsomest of the species, and has the finest timber. "The timber, when fresh cut, has a rosy tint, and afterward deepens in color by exposure. It has a fine, close grain, and is susceptible of a very high polish. It is used for sofas,

arm-chairs, the frames of coach panels, and various other purposes." Wilson; Michaux's Travels, etc.

"The *Sap of the Birch tree* reddens turnsole intensely. It is colorless, and has a sweet taste. The water which forms a greater part of it holds in solution sugar, extractive matter, acetate of lime, acetate of alumina, and acetate of potash. When properly concentrated by evaporation, it ferments on the addition of yeast, and then yields alcohol on distillation. The presence of the acetate of alumina may appear extraordinary in the sap for this reason, that alumina has not yet been discovered in the ashes of the birch tree." Boussingault's Rural Econ. p. 65, ed. 1857.

Betula nigra, Linn. *B. rubra*, Mx. Red birch. Vicinity of Charleston; collected on the Santee river, St. John's, Berkley; Newbern. Fl. March.

Ind. Bot. Dr. Green states that a strong decoction of the bark cured cases of putrid sore throat. It is useful also in pleurisy. Lindley says that the black birch of North America is one of the hardest and most valuable we possess. This might suit the purposes of the engraver, and in the construction of any implements requiring wood of firm texture. We have also the yellow and the cherry birch. The shoots and the twigs of the *B. lanulosa*, or *B. nigra*, said by Wilson to grow in the Carolinas, are used for hoops, and "made into excellent street brooms." Its wood is compact, nearly white, and streaked longitudinally, and useful for various economical purposes. Consult "*Alnus serrulata.*"

Alnus serrulata, Aiton. Alder. Grows along rivulets, Charleston district; Richland, Prof. Gibbes; Newbern. Fl. April.

U. S. Disp. 1224. The bark is astringent. N. Y. Journal Med. v, 7, 8. It had for a long time been neglected; but in the article referred to the decoction is spoken highly of as an alterative and astringent in scrofula, and cutaneous diseases, and it is said to have been very success-

ful in hæmaturia; in these affections producing beneficial results where all other means had failed. Shec., in his Flora Carol., spoke of the alder tags, as being of great service, on account of their alterative powers; a decoction of the leaves has also been used to suppress hemorrhage, and they have been found effectual in relieving dyspepsia and bowel complaints. An astringent decoction may be made of the bark, leaves, or tags—acting also as a diuretic. A tincture may also be used. Poultices made of them are used as a local application to tumors, sprains, swellings, etc. The leaves are applied externally to wounds and ulcers. The inner bark of the root is emetic, and it has been given in intermittents. It is used by tanners and dyers; the shoots, cut in March, will impart a cinnamon color to cloths and flannels. The black alder is used to *color flannels:* "Take the bark, boil it well, then skim, or strain it well; wet the cloth in a pretty strong lye, and dip it into the alder liquor; let it remain till cool enough to wring, and it gives an indelible orange color." The wood does not absorb water easily, and is employed in making posts, and any structure liable to be submerged. The English *Alnus* (*A. glutinosa*) is planted along the side of water-courses, rivulets, and sand-banks, to prevent the encroachment of water by the hardening and binding influence of the roots upon the soil, and also as a border to conceal unsightly or boggy lands. The wood is suited for pipes, pump-trees, and all kinds of subaqueous wood-work, "where it will harden like a very stone," says an old writer; now superseded, says Wilson, "for even these purposes by the Kyanized wood of more close grained trees." The wood of this is also used for various purposes of the turner, for the cogs of wheels, etc. "Charcoal made of its timber has long been highly valued for the manufacture of gunpowder." Wilson's Rural Cyclopædia, art. *Alnus.* I do not know how closely our *A. serrulata* and *A. viridis* resemble the English tree. The bark of alders is astringent, and is used by tanners and dyers; see Wilson. It is, in other words, rich in tannin. The birch (*Betula*

nigra, L.), in fact all of our species, no doubt, contain a certain proportion of the gummy, oily substance peculiar to the *B. alba* of England. The flowers of the latter are highly odoriferous, and the oil is collected. The bark is also used by the tanner. Russia skins are said to be tanned with it, hence the peculiar odor. Our species of birch may no doubt be used for similar purposes. I have little doubt, in consideration of the possession of an astringent and oily, resinous principle, that a tincture of the catkins would serve as an excellent astringent, stimulating diuretic, to be used in gleet, gonorrhœa, and in chronic diseases of the genito-urinary apparatus.

Birch wine is also made in England from the sap of the birch. The papery sheets of birch bark were used as a writing material.

URITICACEÆ. (*The Nettle Tribe.*)

Urtica urens, L. Dwarf nettle. Grows around Beaufort; collected in Fairfield district; Ell. says at St. Mary's, Georgia; vicinity of Charleston, Bach. Fl. February.

Murray's App. Med. iv, 592; Bull. Plantes Vén. de France, 170. It causes an excessive discharge of urine, and Sérapion said that thirty grains of it would purge. In the Supplement to the Dict. de Mat. Méd. by Mér. and de L., 1846, p. 719, we have an account of the remarkable hæmostatic virtues of this and the *U. dioica*, also found in South Carolina. It had originally obtained some favor in this respect, and was used by Sydenham, but had for a long time fallen into disrepute. It has been reserved for M. Guinestet to restore the public confidence in it; and it is now spoken favorably of by Chomel, Lange, and Desbois. Guinestet advises it in hemorrhage, and reports five cases of uterine hemorrhage in which bleeding was instantly arrested; two to four ounces of the juice were given, taken internally, and in the form of injection. It has also been successfully employed in hæmatemesis and epistaxis, and cases of two months duration were cured. The objections of others who were not so successful have been satisfactorily

answered, its pretended therapeutic action being denied by Drs. Kasciakewies and Fiard, who report a case of poisoning from the internal use of two ounces of the concentrated decoction. The supporters have produced well sustained arguments destroying the force of these statements; and Mérat himself speaks favorably of it in an official report made to the Academy, and published in the Bull. de Thérap.; he furnishes a case of nasal hemorrhage, occurring in a girl who was giving birth to a child, and who was at the same time flooding, both of which he succeeded in arresting with the juice of this plant, when everything else had failed. Many others have used it with very favorable results in this and in leucorrhœa. "Spérons," adds the author of the Dict. de M. Méd., "que l'expérience confirmera ces heureux résultats." See Amusat's, Chevallier's, and Mérat's Rapport "sur l'emploi du suc d'ortie comme antihémorragique," made in 1846, in the Bull. de l'Acad. Royale de Méd. ix, 1015. Dr. Menicucci, of Rome, introduces into the vagina a sponge soaked in the juice; and it may be at the same time administered internally. See Abeilhé Médicale, Mai, 1846. M. Guinestet attributes its hæmostatic virtues to a constituent which coagulates milk in the same way that poisons do. See a letter of Mérat, relating a case of uterine hemorrhage existing for two months, which was cured by the juice of the *U. dioica* (in French). Idem. x, 364, 1845; Mér. and de L. vi, 875; Journal de Méd. vi, 492. By analysis, it contains a carbonate, ammonia, chlorophyl, mucus, black coloring matter, gallic acid, tannin, and nitrate of potash, less abundant than in the *U. dioica* (which see).

Induced by these notices to test it myself, I succeeded in obtaining a quantity of the *U. urens* from Fairfield district, S. C. Assisted by Dr. R. A. Kinloch, of Charleston, I proceeded to expose and divide the right common carotid arteries of two sheep, upon the bleeding orifices of which was applied lint covered with a sponge soaked in the cold infusion and the decoction respectively. The results were as follows: the first died from improper manipulation; in

the second, the bleeding ceased entirely—the animal was killed, however, a short time afterward. The juice of the plant seemed to have some effect in coagulating fresh blood poured out into the hand. Upon giving the cold infusion, made with two ounces of the plant to a pint of water, in doses of a wineglassful four times a day, to a patient affected with chronic hæmaturia, who had used tannin, gallic acid, and the infusion of buchu ineffectually, she confessed having derived decided relief from it, but complained of its having brought out an eruption over the body. The experiments in both cases are obviously too meagre to enable me to pronounce positively as to the amount of power the plant possesses. Celsus employed the *Urtica* in paralysis. De Re Medica, l. iii, 27 ; Bull. des Sci. Méd. ix, 77. Flagellation with the branches, which, it is well known, contain stings which produce great irritation, followed by inflammation, has been recommended for bringing out cutaneous and febrile eruptions, as in scarlatina, in apoplexy, in insensibility of organs, in chronic rheumatism, and in fact wherever a powerful external stimulating revulsive is required. For this purpose it has even been employed in the algid period of incurable cholera morbus. Dr. Marchand, Séance de l'Acad. Roy. de Méd. ii, July, 1832; J. Stevoght, Diss. de Urtica, 1707 ; J. Francus, Tractatus Singularis de Urtica Urente, etc. Dilleng, 1726. Both this and the *U. dioica* are found in the Confederate States, and I would invite further and particular examination into properties which are of so valuable a description. I observe no notice of these experiments in the American works. The minute structure of the sting is said to be very curious.

Urtica dioica, L. Common or red dead nettle. Grows along roads and fences; vicinity of Charleston. Fl. Aug.

Dém. Élém. de Bot. iii, 338. It is applied extensively as a stimulating and antiseptic astringent and detersive, the herb and seed being used; the decoction is also alluded to in this work as being used in hemorrhage, bloody urine,

etc. Urtication with this also was employed in rheumatism, paralysis, etc. (See *U. urens.*) The root is advised in jaundice and nephritic diseases. Fl. Scotica, 57 A rennet was made with a strong decoction. One quart of salt was added to three pints of the decoction, and boiled for use, a spoonful of which was sufficient to coagulate a large quantity of milk. Stearns, in the Am. Herbal, 136, refers to its use in jaundice, nephritic disorders, and in hemorrhage. "The juice snuffed up the nose stops bleeding, and a leaf put on the tongue, and pressed against the roof of the mouth, will answer the same purpose." Thorunton's Fam. Herbal. Linnæus, in his Veg. Mat. Med. 511, alludes to its employment in hemorrhage; it was considered lithontriptic and emmenagogue, and adapted to those in whom the hemorrhagic diathesis prevailed; all of which opinions I quote, as coming from old authors. "Steel dipped in the juice becomes more flexible." The seeds produce an oil, which, taken in moderate quantities, excites the system, especially "*les plaisirs de l'amour.*" Twenty or thirty grains of these induce vomiting, and a few of them, taken daily, are said to reduce excessive corpulency. Mér. and de L. Dict. de M. Méd. vi, 613. By Salladin's analysis, in Journal de Chim. Méd. vi, 492, the plant contains nitrate of lime, hydrochlorate of soda, phosph. potash, acetate of lime, ligneous matter, with silicate and oxalate of iron. Pallas, Voyage, i, 700; Gmélin, Flora Siberica, ii; Mathiole, Comm. 560. It is said that animals which feed on the plant become both fatter and stronger. Mém. de Hærlem, xxvi. The stalks have a fibre like hemp, and have been employed for making cordage; the root boiled in alum will dye a yellow colour. I have obtained a fine yellow colour by boiling the agrimony (*Agrimonia eupatoria*) in water with alum. See Hooke's Microscop. Diss. xxii, 12, and Guettard, Mém. de l'Acad. des Sci. de Paris, 1751, 350, for a description of the structure of the sting, and the Petersburg Journal, 1778, 370, for a notice of the value of the stalks in making ropes and paper. The U. S. Disp., 1303, barely notices the plant. Late experiments may have escaped the attention of its indefatigable authors.

The nettle plants are known to be closely allied to those bearing textile fibres, and indeed thread can be made from all the nettles. The *Bœhmeria nivea*, formerly known as *Urtica nivea*, is the famous China grass which has been introduced into this country by the Patent Office on account of its value for manufacturing purposes. The China grass cloth is made from it. Dr. Royle says that it has sold in England at from £80 to £120 a ton. See Patent Office Rep. 244, 1855, and Dr. J. F Royle and Dr. Roxburgh's treatises on the oriental fibres. Experiments may be made in the Confederate States upon the yield of fibre from the *Urtica urens* and *dioica*, which grow spontaneously. Boiling in alkaline solutions and lime-water is used in preparation of such plants. See article cited; also *Apocynum*.

The common nettle, remarks Mr. Lawson, who ranks it with flax, hemp, cotton, phormium, and other fibre-yielding economical plants, has been long known as affording a large proportion of fibre, which has not only been made into ropes and cordage, but also into sewing-thread and beautiful white linen-like cloth of superior quality. The fibre, he adds, is easily separated from other parts of the stalk, without their undergoing the processes of watering and bleaching, although by such the labor necessary for that purpose is considerably lessened. Like those of many other common plants, the superior merits of this generally accounted troublesome weed have hitherto been much overlooked—quoted by Wilson in Rural Cyc. It is stated that the roots possess astringent and diuretic properties, and have been found serviceable in poultices for tumors, and decoctions for other complaints. The leaves, chopped up with meal or with boiled potatoes, are used for feeding ducklings, young turkeys, and full grown poultry, especially in winter, and are said to promote the laying of eggs. Nettles are sometimes boiled and eaten in the manner of greens. Laborers use the young tops of nettles as a pleasant, nourishing, and mildly aperient potherb, either in soups or in accompaniment with salt beef or pork. Rural Cyc.

Urtica pumila, L. Grows in wet soils, vicinity of Charleston; Richland, Prof. Gibbes. Fl. Sept.

Griffith, Med. Bot. 572. This is quite smooth; is said to be an excellent application to inflamed parts, and to relieve the eruption caused by the *Rhus*. Griffith invites further investigation.

Cannabis sativa. Hemp. Ex. Nat. Cultivated in the upper districts.

The value of this plant for manufacturing purposes, for making ropes and cordage, is well known. It may become a most important question whether or not we can raise it in the Atlantic states with as much profit as in Kentucky, or to repay the labor bestowed upon it. I have not been able to ascertain whether the juice of the plant, as cultivated here, possesses the intoxicating properties of the East India species (*C. Indica*), though it has been asserted that "water in which it is soaked becomes violently poisonous." See a paper in Patent Office Reports. 1848, p. 574, from Louisville Journal, containing a full description of varieties, mode of production, and preparation of hemp. Count Chaptal says, in his Chemistry applied to Agriculture, that M. Proust had determined, after numerous experiments, that the stalk of hemp furnished the best charcoal for the manufacture of gunpowder—better than the willow. From the seeds is extracted an oil, generally employed by painters. The fine oil obtained from the seeds is peculiarly adapted for burning in chambers, as it is perfectly limpid, and possesses no smell. The Russians and Poles, even of the higher class, bruise or roast the seeds, mix them with salt, and eat them on bread. It expels vermin from plantations of cabbages if planted on the borders of fields; if planted with that vegetable, no caterpillar will infest it. Willich's Dom. Enc. The seeds may be sown in April or May, from two to three bushels per acre, either broadcast, and hoeing out the plants to a distance of sixteen or seventeen inches, or by the drill, at a distance of thirty inches. In the autumn the plants are pulled, the male plants first, and the female plants six

or seven weeks afterward, when they have ripened their seed. Thus there are two harvests of the hemp crop. The male plants are readily known by their faded flowers, and yellowish color. They are then tied in small bundles and carried to the pool, where they are to be steeped. Hemp, like flax, poisons the water in which it is steeped. The same process is followed when the female plants are pulled; only these, before they are steeped, have their seeds beaten out.

The process of steeping commonly lasts four or five days, and is continued until the outside coat of the hemp readily separates. It is then carefully and evenly spread on some grass turf, where it remains for three or four weeks, being turned over about twice every week, by which the decomposition of the woody part of the stem is materially accelerated. It is next carried to the barn, where it is bruised by the break, a machine constructed for the purpose; it is then bound up into bundles, and carried to market. (*Low's Prac. Agr* p. 348.) There is a paper on a species of African hemp by Mr. A. Hunter (*Trans. High. Soc.* vol. iii, p. 87); others on the cultivation of hemp in America, by Mr. W. Tonge (*Ann. of Agr.* vol. xxiii, p. 1); in Italy (*ibid.* vol. xvi, p. 139, and vol. ii, p. 216), and in Catalonia. (*Ibid.* vol. viii, p. 243.) It seems that 100 parts of Indian hemp-seed yield 20 to 25 per cent. of oil. (*Com. Agr. Asiat. Soc.* 1838, p. 69.) See Flax.

Among our native substitutes for hemp are the *Apocynum cannabinum*, the Canada Golden Rod; *Solidago canadensis*, L. (*S. procera*, of Ell.); the Sunflower (*Helianthus*) affords single filaments, which are said to be as thick and as strong as small packthread; also our *Æsclepias Syriaca*, *Urtica dioica* and *Yucca filamentosa* or bear-grass. See these plants. Elliott says that bear-grass possesses the strongest fibre of any vegetable whatsoever. Its roots are extensive, and bear transplanting. See Prep. of Hemp, Farmer's Encyc. See, also, files of the Kentucky Farmer. Paper is made of waste hemp, whitened. The seeds afford an oil, which, boiled in milk, is recommended against coughs, and is also

said to be useful in incontinence of urine. In India an intoxicating liquor is made from the leaves, resembling opium in its effects.

Humulus lupulus, L. Hop. Grows in the mountains of South Carolina, and generally cultivated in Confederate States.

Dr. McBride; Ed. and Vav. Mat. Méd. 185; Chap. Therap. and Mat. Med. i, 348, and ii, 455; Eb. M. Med. ii, 55; U. S. Disp. 374; Big. Am. Med. Bot. ii, 163; Freake, Med. Phys. Journal, xiii, 432; Thompson's Lond. Disp. 200; Bigsby, Lond. Med. Repos. v, 97; Bryorly's Inaug. Diss. Phil. An. 1803; Ives in Silliman's Journal, ii, 302; Thornton's Fam. Herbal, 820. This plant is certainly possessed of some narcotic power. According to Dr. Latham, an infusion of it is a good substitute for laudanum. It is employed in doses of one and a half drachms in allaying the distressing symptoms of phthisis. It augments the secretions, removes pain and irritability, and induces sleep. Dr. Maton, Fell. Roy. Soc. Coll. Phys., says that large doses produce headache. It is thought to be a specific in removing asthmatic pains, without increasing the secretions. Mér. and de L. Dict. de M. Méd. iii, 544; Pliny, lib. xxi, c. 15; Flore Med. iv, 196. It is given with good effect as a stomachic, in inappetency and weakness of the digestive organs. Mat. Med. Indica. 120; Bull. des. Sci. Med. xvi, 145; Journal des Sci. Med. xli, 376; Edinb. Journal, iv, 23; Diss. Medici de Humuli medici viribus medicis, Edinb. 1803; Bromelius, "Lupulogia," Stockholm, 1687; Obs. of Freake on the Hop, Lond. *Lupulin*, obtained from it, is said to diminish the force of the pulse. See Journal de Chim. Méd. ii, 527; Journal de Pharm. viii, 228 and 330. In the Supplem. to M. and de L. Dict. de M. Méd. 1846, a case is reported of a girl being poisoned by the hop. Rev. Scientifique, Mars, 1845; Journal de Pharm. Mars, 1842. Much use is made of the hop poultice in allaying pain, applied over the part. Its domestic value in preparing the liquor known as yeast is obvious, as well as

for other purposes where fermentation is to be established in the manufacture of many alcoholic drinks and malt liquors. The medicinal properties of the hop are said to depend upon the *lupulin*, a peculiar resinous secretion contained in the glands, which is obtained by thrashing and sifting the strobiles. By analysis it consists of volatile oil, bitter principle, or *lupulin*, resin, etc.; when administered internally, this has all the good effects of the hop; given in pill, in doses of six to ten grains, or in tincture in those of a half to one drachm; and it may also be added to poultices, ointments, etc. Ives' Experiments; Griffith, Med. Bot. 574. The tincture of *lupulin* is said to be preferable; dose, one to two fluid drachms.

Patent Office Rep. 280, 1857, contains a very full treatise on the hop, condensed from various sources—an analysis of the plant, the best mode of cultivation, gathering, etc. As the raising of the hop is of great importance, I would refer cultivators to this article. It is said to be one of the very most exhausting among cultivated plants, both in respect to the organic and mineral constituents which it extracts from the soil; so that valleys containing the *debris* of the surrounding country should be selected. See, also, Wilson's Rural Cyc., art. "Hop," "Beer," "Ale." His account of cultivation, diseases, etc., of the hop is full and instructive. The stem of the hop contains a fibre like hemp, which is used in making a strong white cloth in Sweden, though it requires long steeping to separate the fibre. The hop plant is rich in tannin, and has been used for tanning: the ash yields 25. of potash, 15. of lime, magnesia, salt, etc. The suckers of the hop are said to form an agreeable vegetable for the table when dressed like asparagus. Honey dew is frequent on hop plants frôm the perforations of the aphis. It is said to be very abundant on cotton plants.

An article also on the cultivation of the hop can be found in Patent Office Reports, 1854, p. 354.

I quote from the paper mentioned above as follows, as I consider information on this topic important:

The hop is a perennial plant of easy cultivation, and

will grow in any part of the Western states. Its domestic uses are so obvious, that no farm or garden should be without one or more roots. It requires a rich, deep, mellow soil, with a dry, pervious, or rocky subsoil. The exposure in a northern climate should be toward the south, as on the slope of a hill, or in any well sheltered valley. It may be propagated by seeds, or by divisions of the roots; but it is more usual to plant the young shoots which rise from the bottom of the stems of old plants. These are laid down in the earth till they strike, when they are cut off and planted in a nursery bed. Care must be taken to have only one sort of hops in the same plat or field, in order that they may all ripen at the same time. The ground having been prepared for planting, it is divided by parallel lines six feet apart, and short sticks are inserted into the ground along the lines at seven feet distance from each other, and so as to alternate the rows, as is frequently done with fruit trees and other plants, in what is called the "*Quincunx* form." By this method every plant will be just seven feet from each of its neighbors, although the rows will be only six feet apart, and consequently about one-eighth of land will be actually saved, as indicated in the diagram below:

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At each stick a hole may be dug two feet square and two feet deep, and lightly filled with the earth dug out, mixed with a compost prepared with well rotted dung, lime, and muck. Fresh dung should never be applied to hops. Three plants are next placed in the middle of this hole six inches asunder, forming an equilateral triangle. A watering with liquid manure will greatly assist their taking root, and they will soon begin to show "vines." Sticks three or four feet long are then stuck in the middle of the three plants, and the vines are tied to them with twine or bass, till they lay hold and twine around them. During their growth the ground should be well hoed and forked up around the roots, and some of the fine mould thrown

around the stems. In favorable seasons a few hops may be picked from these young plants in autumn, but in general there is nothing the first year. Late in autumn the ground may be carefully dug with a spade, and the earth turned toward the plants, to remain during the winter. Early in spring the second year the hillocks around the plants should be opened, and the roots examined. The last year's shoots are then cut off within an inch of the main stem, and all the suckers quite close to it. The latter forms an agreeable vegetable for the table when dressed like asparagus. The earth is next pressed round the roots, and the parts covered so as to exclude the air. A pole about twelve feet long is then firmly stuck into the ground near the plants; to this the vines are led, and tied as they shoot, until they have taken hold of it. If by accident a vine leaves the pole it should be carefully brought back to it, and tied until it takes new hold.

Mr. J. J. Bennett, of New York, says: "The manner in which I cultivate hops is as follows: After ploughing the ground intended for hops, I use about ten loads of leached ashes per acre for a top-dressing, after which it should be well harrowed. The rows should be eight feet apart, and the hills seven feet apart. In setting, a line is used with marks indicating the distance between the hills. After the line is drawn, small sticks are set to each mark. Roots are to be cut, two joints on each piece, three pieces to the hill; cover about two inches. The ground may be planted with corn the first year, as the hops will not run until the second. It should be sown the first of May in drills three and one-half feet apart; sow with seed-drill. The first year corn may be raised; plant one foot from the teasel row. I weed them twice the first year; the second year they are to be cultivated and hoed twice. The first of August I cut such as are ripe, which will be known by the shedding of the blossoms. I cut at four different times, the stems to be about four inches long. They are to be spread on shelves about eight inches deep, one tier above another. There should be a good circulation of air, that

they may cure well. I paid for cultivating five acres forty-two dollars; paid for harvesting eighty-five dollars." See a full description of hops, mode of cultivation, preparations, adulterations, etc., in Johnson's Chemistry of Common Life, vol. ii, p. 36; also Ure's Dictionary of Arts and Manufactures, articles "Hop," "Ale," "Beer," etc. Consult Pereira's Mat. Medica, Chaptal's Chemistry applied to Agriculture, Boussingault's Treatise on Agriculture in its relations with Chemistry, and Thaër's Agriculture, for mode of planting, preparation, etc. See, also, Phillips' History of Cultivated Vegetables. The uses of the hop pillow and the tincture of hops, as sedatives and mild narcotics, are well known; but for the medicinal application consult the various works on the materia medica.

The great importance of cultivating this plant on a large scale for manufacture of yeast should be impressed upon the people. See receipt books for mode of making *spruce* and *hop beer* with hops, and the essence of spruce. Mode of making hop beer is as follows: For a half-barrel of beer, take half a pound of hops, and half a gallon of molasses. The latter must be poured by itself into the casks. Boil the hops, adding to them a teacupful of powdered ginger in about a pailful and a half of water; that is, a quantity sufficient to extract the virtue of the hops. When sufficiently brewed, put it up warm into the cask, shaking it well in order to mix it with the molasses. Then fill it up with water quite up to the bung, which must be left open, to allow it to work. You must be careful to keep it constantly filled up with water whenever it works over. When sufficiently worked it may be bottled, adding a spoonful of molasses to each bottle. Thornton's Southern Gardener.

Ale and beer can be made in the Confederate States, though not with the same advantage as in colder climates. Though without practical experience, I am forced to the conviction that the desideratum is cool cellars. In the rural districts what are called dry cellars are constructed in the clay, just above the water-bearing stratum, the top enclosed

or covered with a closed house. The temperature of these cellars is quite low, and they are used in keeping milk, butter, melons, cider, etc. I think their temperature would allow the manufacture and preservation of either wine, ale, or beer. Ale has been made near Charleston, at Mount Pleasant; but to prevent fermentation, cellars are required. The reader interested in the subject can find a description of the English method of making malt liquors in Ure's Dictionary of Arts and Manufactures, in Wilson's Rural Cyclopædia (art. "Ale"), in Solly's Rural Chemistry, p. 178, see art. "Fermentation and Distillation"; also, Thornton's Family Herbal, "Mentha," p. 565., Child on Brewing, Combrune's Theory and Practice of Brewing. In England they use *Gentiana*, *lutea*, *purpurea*, and *rubra* as substitutes for hops. Consult this volume, art. "Persimmon" (*Diospyros*), "Sassafras" (*Laurus*), "Blackberry" and "Cherry" (*Cerasus*), "Apple" (*Pyrus*), for liquors.

Morus alba, L. Mulberry. Nat. Diffused; vicinity of Charleston. Fl. March.

Bell's Pract. Dict. 319; U. S. Disp. 463; Dém. Élém. de Bot. The root is bitter, and very astringent, and is useful in relaxed states of the bowels, diarrhœa, etc. Lind. Nat. Syst. Bot. 186. It contains *myroxylic* acid with lime. Turner, 640. See analysis in the Journal de Chim. Méd. x, 676. The bark is a purgative vermifuge, but is more important on account of "the leaves being the favorite food of the silk-worm." That this plant is easily cultivated in the Confederate States may some day make it a source of great profit in the production of silk. The *mania* may again be revived, under auspices which may deprive the term of the slight suspicion of reproach which is attached to its objects. Mér. and de L. Dict. de M. Méd., Supplém. 1846, 496; Griffith, Med. Bot. 579.

As "this is the species upon which the *silk-worm* feeds," the following brief directions concerning the manufacture of silk, from the Rural Cyc., may be useful; and as the production of the raw silk is in the power of almost any one,

if the females of numerous families throughout the Confederacy would devote their leisure to it, the aggregate amount of silk produced would contribute still further to render us independent as a people.

After the worm has enveloped itself in the cocoon, seven or eight days are allowed to elapse before the balls are gathered. The next process is to destroy the life of the chrysalides, which is done either by exposure to the sun, or by the heat of an oven, or of steam. The cocoons are next separated from the floss, or loose, downy substance which envelops the compact balls, and are then ready to be reeled. For this purpose they are thrown into a boiler of hot water for the purpose of dissolving the gum, and being gently pressed with a brush, to which the threads adhere, the reeler is thus enabled to disengage them. The ends of four or more of the threads thus cleared are passed through holes in an iron bar, after which two of these compound threads are twisted together, and made fast to the reel. The length of reeled silk obtained from a single cocoon varies from three hundred to six hundred yards; and it has been estimated that twelve pounds of cocoons, the produce of the labors of two thousand eight hundred worms, which have consumed one hundred and fifty-two pounds of mulberry leaves, give one pound of reeled silk, which may be converted into sixteen yards of *gros de Naples*. Those cocoons which have been perforated cannot be reeled, but must be spun on account of the breaks in the thread. The produce of these balls when worked is called *fleuret*. The raw silk, before it can be used in weaving, must be twisted or thrown, and may be converted into singles, tram, or organzine. The first is produced merely by twisting the raw silk to give more firmness to its texture. Tram is formed by twisting together, but not very closely, two or more threads of raw silk, and usually constitutes the weft or shoot of manufactured goods. Organzine is principally used in the warp, and is formed by twisting first each individual thread, and then two or more of the threads thus twisted, with the throwing-mill. The

silk when thrown is called *hard silk*, and must be boiled in order to discharge the gum, which otherwise renders it harsh to the touch, and unfit to receive the dye. After boiling about four hours in soaped water, it is washed in clear water to discharge the soap, and is seen to have acquired that glossiness and softness of texture which forms its principal characteristic. The yarn is now ready for weaving. Rural Cyc. I saw in Italy the manufacture of silk going on in most of the large towns, and many in the country prepare raw silk for the manufacturer and weaver.

The successful rearing of silk-worms, remarks Wilson, is a distinct art, and requires peculiar attention. They are subject to a variety of maladies. In many places it is usual to import the eggs from some district that has acquired reputation for their production. These are packed like grain, and are chosen in the same manner. The eggs are in many places hatched by the heat of the human body. The silk is contained in the form of a fluid resembling varnish, in long, cylindrical sacks many times the length of the animal, and capable of being unfolded by immersion in water. This fluid is easily forced out, and advantage is sometimes taken of this circumstance to procure threads much coarser than usual, which are extremely strong, and impervious to water. Rural Cyc. At the agricultural meetings in South Carolina and Georgia articles of home-made silk are occasionally presented.

From an essay on the culture and manufacture of silk. By H. P Byram, Brandenburg, Meade county, Ky.—Experience of past ages has fully proved that the climate of the United States is as well adapted to the nature and habits of the silk-worm, and the production of silk, as that of any other country. Several varieties of the mulberry are indigenous in our soil, and those generally used in the native country of the silk-worm succeed equally well in our own soil and climate. Hence, from the nature and habits of American people, we must soon become the greatest silk-growing nation on the earth. The first step toward the production of silk is to secure a supply of suitable food for the silk-worm.

Having tried all the varieties introduced into our country, I find the *Morus multicaulis* and the Canton varieties, all things considered, most suitable for that purpose.

Propagation of the mulberry.—Although the experience of some years past has rendered this subject familiar to many, yet those now most likely to engage in the *legitimate* business of silk-growing may be less acquainted with the propagation of the tree. I shall give some brief directions on the subject:

Almost any soil that is high and dry, and that will mature Indian corn, is suitable for the mulberry. That, however, which is inclined to be light or sandy is the best.

The *Morus multicaulis* may be propagated by cuttings or layers (or a good variety may be raised from the seed). Cuttings may be of one or more buds, planted perpendicularly in a light, mellow bed of good soil. They should be planted when the spring has fully opened, or about the usual time of planting corn. They may be planted in the rows, about twelve inches apart, and the rows at a sufficient distance to admit of thorough cultivation with a plough or cultivator. The ground should be kept mellow until past midsummer.

Select a suitable piece of ground for a permanent orchard. It would be well if broken up in the fall, and again ploughed in the spring, and, if followed with the subsoil plough, it would be advantageous. After a thorough harrowing it should be laid off in rows, each way *eight* feet by *four*, with the plough. The trees at one year old from the nursery should be taken up, the tops cut off near the roots, and one planted in each of the squares or hills.

Having tried various methods of planting, and different distances, I prefer those here given. This will admit the free use of the plough and cultivator *both ways*.

In latitudes north of 38° or 40°, where land is dear, they may be planted much nearer. If a sufficient quantity of cuttings from old trees cannot at once be procured, the trees from the nursery should be taken up in the fall, and

buried in a cellar, or upon the *north side* of a bank or hill, in alternate layers of trees and earth, and the whole protected by a shed from the rains of winter, as the plants seldom sufficiently mature the first season from the cuttings to withstand the winters of a northern climate, particularly that portion above the ground. South of 38° of latitude these precautions may not be necessary.

The Canton mulberry is a more hardy kind, resembling in some degree the varieties known as the common Italian, producing a large, full, thick leaf. This variety is propagated from seed and from layers, but does not readily strike root from cuttings.

In 1838 I procured a quantity of this seed from Canton, which produced a *variety* of plants. Those producing the greatest quantity of fruit yield an inferior leaf.

They are now propagating this variety very extensively at the silk-growing establishment at Economy, Pennsylvania, which, in connection with the *Morus multicaulis*, constitute the principal food used at this establishment.

The fruit should be gathered when fully ripe, and the seed washed out and dried. If south of the 39th parallel of latitude, they may be planted the same season. North of this, they should be planted in the following spring, in a bed of rich earth prepared as for beets or onions, and planted in drills about *eighteen inches* apart. The young plants should be thinned to the distance of from *one* to *three* inches from each other. They should be well cultivated, when they will attain the height of three or four feet the first season. In the fall, in a northern climate, the young trees should be taken up and protected during the winter, as directed for the *Morus multicaulis*. [This is not necessary in the Southern states.]—*So. Cult.*

In the following spring the branches may be taken off *near* the main stem, the top shortened, and the whole tree planted, completely covering the roots and main stem from one to two inches deep. In this way two or more trees may be produced from each plant. If a full supply can be procured, the *roots* of the young plants may at once be

removed to the orchard. They may be allowed to stand much nearer than the *multicaulis*, leaving only sufficient room for cultivation.

When seed is required it would be well to plant out a portion from the seed-bed at once, as standards for this purpose, always selecting those bearing *full*, *heart-shaped* leaves.

The leaves of the white Italian produce a good, heavy cocoon, and should always be used in the last age of the worms when other larger-leaved varieties cannot be obtained.

Cultivation.—The mulberry orchard should be *annually* cultivated. The ground kept mellow and free from weeds until the middle of July.

The fields should be divided into three equal parts, and after the second season from planting, one-third each year should be cut down near the ground. This will cause a more vigorous growth, and an abundant crop of foliage.

Feeding apartments.—Various plans have been proposed and adopted for cocooneries, or feeding-sheds, for the silk-worms, none of which, I think, are without objection, except a perfect laboratory, so constructed as to be able to fully control the atmosphere and temperature within. This, however, would be too expensive, and require too much skill and judgment for general adoption.

Open or shed-feeding has been employed with success of late years, and for general use may be the most successful for family establishments. This, however, confines the whole business, particularly in the Northern states, to one or two crops in the season. South of Ohio more can be successfully fed.

These sheds may be cheaply made by setting some durable posts in the ground, say from six to eight feet high, with a roof of shingles or boards. The roof should project two feet over the sides. There should be some temporary protection to the ends and sides of the shed; perhaps the best and cheapest can be made of strong cotton cloth (Osnaburg); three or four widths should be sewed together,

with small rods across the bottom, which will answer as weights, and also as rollers, which, by the aid of a pulley, may be rolled or let down at pleasure.

The width of the sheds must be governed by the size of the hurdles or feeding-trays used. The width that I have adopted is from eighteen to twenty feet. The length according to the extent of the feeding contemplated.

Where it is designed to carry on an extensive business, a building should be constructed expressly for the purpose. It should be on an elevated situation, convenient to the mulberry orchard. There should be a cellar under the building. Any material commonly used for building may be employed. If of wood, weather-boarded and plastered. It would be well to fill up the space between the two with tan bark or unburnt brick, or something of the kind, which will render the temperature more uniform. The width of the building should be twenty or twenty-eight feet—the former admitting of two, and the latter of *three double ranges* of hurdles or trays of suitable size; the length suited to the extent of the business designed. It should be two stories high, and so constructed as to be thoroughly ventilated. There should be two double doors in each end, with doors, windows, and ventilators in the sides. The windows should extend to near the tops of the rooms. There should be sliding ventilators near the floor. The windows may be filled with oiled paper or cloth, which will admit the light and exclude the sun. It would also be important to have under each tier of hurdles, through the floor, two planks of ten inches width each, hung with hinges, that they may be raised at pleasure by a pulley. Also an upright ventilator on the roof, fitted with blinds, through which a constant draft may be kept up.

In one end of the building, in *each* of the two doors, there should be a ventilating wheel made of thin boards (plank), much after the form of the wheels applied to the sterns of our steam-propellers. These wheels should be about two feet in diameter. They should be put in motion for a few minutes every hour, or oftener in still

weather. Both may be made to turn by one crank, connecting each by bands and whirls to the main shaft.

An air-furnace, such as is now employed in heating churches and other buildings, should be constructed in the cellar, and so arranged as to draw from the feeding-rooms all the air necessary to supply the furnace. The air, when heated in the chamber, should be conveyed through the whole length of the rooms, in a square pipe with openings at short distances from each other, which should increase in size as they recede from the furnace. These openings may be so connected as to be all closed at once, or a valve applied at the air-chamber may be used to cut off the communication of heated air when the temperature is sufficiently high in the rooms, suffering the hot air to escape outside of the building. In the last ages of the worms the furnace will be found of great benefit, even when the heat is not required in the rooms. for the purpose of drawing off and consuming the impure air of the cocoonery.

At Economy, they not only make use of air-furnaces, but in an adjoining building they have a large air-pump constantly in operation, connected with the cocoonery by a pipe with small openings through the length of the building. This pump is kept in motion by a steam-engine.

With good eggs, when proper means have been employed for their preservation, and the feeding-apartments thoroughly ventilated, I do not know of a single instance where the worms have proved unhealthy.

From the conviction that proper regard had not generally been paid to the ventilation of cocooneries, in the summer of 1842 I commenced a series of experiments, by which I ascertained that the silk-worm during its last age consumed nearly its own weight of leaves daily; and that the amount of exhalations or imperceptible perspiration given off in *proportion* to the quantity of food consumed, was about equal to that ascertained to escape from a healthy man.

I found, from the most carefully conducted experiments,

that the weight of one hundred thousand silk-worms, about five days before their time of winding, was four hundred and fifty-eight pounds, and that they would consume daily three hundred and seventy-two pounds of leaves,* and that their increased weight in twenty-four hours from the food consumed was forty-six pounds, and that the enormous amount of two hundred and six pounds was given off in the same time, in the form of exhalations or imperceptible perspiration alone. This, then, I think, fully explains the cause of disease complained of by many, and establishes the importance of ventilation in every possible form.

In one corner of the building there should be a hatching-room, with which the furnace below should be connected, so as to receive a greater or less degree of heat, as may be required, without reference to the temperature of the feeding-rooms.

Fixtures.—In fitting up the hurdles or feeding-shelves for a building of twenty feet wide, it will require a double range of posts, two and a half or three inches square, on each side of the centre of the room, running lengthwise, and the length of the shelves apart in the ranges, and each two corresponding posts, crosswise of the ranges, about the width of the two shelves apart. On each double range across the posts are nailed strips, one inch or more in width and about fifteen inches apart, on which the trays or hurdles rest, which may be drawn out or slid in as may be found necessary in feeding. The aisles or passages of a building of the above width will be four feet each, allowing two feet for the width of each *single* hurdle.

The hurdles that I have used for many years are of twine net-work. A frame is first made five feet long and two feet wide, of boards seven-eighths of an inch thick, and one and a half inches wide. There should be two braces across the frame at equal distances of five-eighths by seven-

* Had these worms been fed in the ordinary manner they would have consumed many more leaves in the same time. But to preserve the greatest possible accuracy, through the whole experiment they were fed rather sparingly.

eighths of an inch square. On a line, about half an inch from the inner edge of the frame, are driven tacks *nearly* down to their heads, at such distances as will make the meshes of the net about three-quarters of an inch square. Good hemp or flax twine is passed around these tacks, forming a net by passing the filling *double* over and under the warp, or that part of the twine that runs lengthwise. This twine should be somewhat smaller than that running lengthwise. On a damp day the twine becomes tight; I then give the netting two good coats of shellac varnish. This cements the whole together, and renders it firm and durable.

The varnish is made by dissolving a quantity of gum shellac in alcohol in a tin covered vessel, and placed near the fire. It should be reduced, when used, to the consistence of paint.

Another set of frames is made in the same way and of the same size, and covered with strong cotton or tow cloth; this is secured with small tacks. Upon these the net frames rest, which serve to catch the litter that falls through from the worms.

Hurdles made and supported in this manner admit of a more free circulation of air, and the litter is less liable to mould or ferment, and can be removed and cleaned at pleasure.

With this kind of hurdle and screen I make use of winding-frames, constructed in the following manner: a light frame is made of boards one and a half inches wide, and the length of the hurdles, and two feet and four inches wide; this is filled crosswise with thin laths about one inch apart in the clear. The manner of using these will be hereafter explained. They answer the twofold purpose of winding-frames and mounting-ladders.

The care and expense required in fitting up a house on this plan may prevent its general adoption.

The most common method that has been heretofore employed is permanent shelves; but the labor required

to keep the worms properly cleaned renders this plan objectionable.

At Economy, Penn., the rearing of the silk-worm is now carried on to a great extent, and more successfully than in any other part of the United States, or perhaps the world. Their houses are two stories high. The worms are fed on small trays about eighteen or twenty inches wide, and about three feet long. They are supported in the same manner as the hurdles above described, and are about six inches apart. When the worms are about ready to wind, they are transferred to the upper story, to permanent shelves about sixteen inches apart, where they form their cocoons in bunches of straw placed upright between the shelves. The worms are cleaned at least once after every moulting, and after the last, every day. For this purpose they have nets woven or knit of cotton twine, something larger than the size of the trays, with meshes of various sizes suited to the age of the worms. For the last age they are about three-quarters of an inch square. They are used without frames. When it is required to remove the worms from their litter, the nets are laid lightly over them, and then plentifully fed. When the worms have arisen upon the fresh leaves, they are removed by two persons taking hold of the four corners of the net and transferring them to clean trays, held and carried off by a third person. One hundred thousand are changed in this manner in two hours.

Description of the silk-worm.—It will be necessary for the inexperienced culturist to have some knowledge of the forms, changes, and appearances of the silk-worm before he enters upon the duties of his interesting charge.

The silk-worm is a species of caterpillar, whose life is one continual succession of changes, which in due time becomes a moth or winged insect, like others of the genus.

The time occupied in going through its different forms of existence varies in different countries — governed by climate, temperature, and the quality and quantity of the

food upon which it is fed, and the nature of the particular variety of the insect.

The worm changes or casts its skin (of the common varieties) four times before it attains its full growth. These changes are called moultings, and the periods intervening between the several moultings are termed ages. When it is first hatched it is of a blackish color, which afterward becomes lighter, varying almost daily to different shades, and in different varieties through every age, to the close of the last, or near the time of spinning, when it assumes a grayish yellow, semi-transparent appearance.

Having tried all the varieties that have been introduced into the United States, those I consider the best are known as the *Chinese Imperial*, producing a large, salmon-colored, pea-nut-shaped cocoon; and a kind called the Pea-nut, producing a mixture of white and salmon-colored cocoons. This variety produces a larger and more firm cocoon than any of that name that I have seen.

Time of hatching.—Rearing.—When the leaves of the mulberry have put forth to the size of about an inch in diameter, it may be generally inferred that the proper time for hatching the worm has arrived.

The papers or cloths containing the eggs should then be brought out and placed in the hatching-room, upon a table or trays made for the purpose. When artificial means are employed, the temperature should be *gradually* raised until the time of hatching, which will be in about ten days, to 75° or 80° of Fahrenheit's thermometer. But few worms will make their appearance on the first day, but on the second and third the most will come out; should there be a few remaining on the fourth day, they may be thrown away, as they do not always produce strong and healthy worms. When the worms begin to make their appearance, young mulberry leaves cut into narrow strips should be laid over them, to which they will readily attach themselves; these should be carefully removed, and placed *compactly* upon a cloth screen or tray prepared for them, and other leaves placed upon the eggs for the worms that still

remain, which should be passed off as before. A singular fact will be observed, that all the worms will hatch between sunrise and before noon of each day. Care should be taken to keep the worms of each day's hatching by themselves, as it is of the greatest importance to have the moultings and changes of all the worms as simultaneous as possible. It is also important that the worms that have been transferred to the trays should *not* be fed until the hatching for the day is completed, so that all may be fed equally. Young and tender leaves should be selected to feed the worms with; these should be cut with a sharp knife into pieces not exceeding a quarter of an inch square, and evenly sifted over them. They should be fed in this way six or eight times in twenty-four hours, as nearly as possible at regular and stated periods.

It will be impossible to lay down any definite rules for the quantity of leaves necessary for a given number of worms for each succeeding day through every age. After a little acquaintance with their nature and habits, the intelligence and judgment of the attendant will be the best guide; they should, however, have as much as they will eat, but after a few days care should be taken not to give them more than they will generally consume, as this will increase the accumulation of litter, which will endanger the health of the worms. In the last age they eat voraciously, when they should be well supplied. A quantity of leaves should always be on hand in case of wet weather.

When the average range of the thermometer is between 70° and 80° the several moultings will take place near the fifth, ninth, fifteenth, and twenty-second days after hatching. It may be known when the worms are about to cast their skins, as they cease to eat, and remain stationary, with their heads raised, and occasionally shaking them. This operation will be more distinctly observed as they increase in size through their succeeding ages.

Assuming the above temperature as the standard, the quantity of leaves for the first three days of this (the first) age must be gradually increased at each feeding, after

which they will require less at each succeeding meal until the time of moulting arrives, when for about twenty-four hours they eat nothing. But as it is seldom the case that all cast their skins at one and the same time, some will still be disposed to eat, when a few leaves must be *cut fine* and *sparingly* scattered over them, so that those that remain torpid may be disturbed as little as possible. They must now be carefully fed in this way until it is discovered that some have moulted, when the feeding must cease altogether until the most of them have recovered. This rule must be particularly regarded through all the succeeding moultings, otherwise some of the worms will be far in advance of others; and this want of uniformity will increase throughout each succeeding age, and to the period of winding, which will not only result in great inconvenience in gathering the cocoons, but will materially injure the worms, and consequently lessen the crop of silk.

When the *greatest portion* of the worms have moulted, and appear active, leaves a little wilted are laid over them, by which they are passed to clean trays. If any still remain that have moulted, they must be transferred in the same manner, by laying more leaves upon them. The remnant of worms that have not changed their skins should be left upon the litter, and added to those of the next day's moulting. By closely regarding these rules throughout the several ages, the worms will generally all commence the formation of their cocoons about the same period.

After having gone through and furnished all the worms with a quantity of leaves, it is well to go over a second time, and add more where they seem to require it.

Very young and tender leaves must be given to the worms in the first age, after which older ones can be given as they advance in age until after the last moulting, when they should be fed upon sound, full-grown leaves.

After the second moulting the leaves, where large crops are fed, may be cut by running them twice through a common *rotary* hay or straw-cutter, of Hovey's, or one of a similar make.

The worms will frequently heap together, and become too thick, as they increase in size. When they are fed the leaves must be spread, and the space enlarged, or they may be removed by leaves or twigs of the mulberry to places unoccupied. If they are permitted to be crowded, disease is apt to follow, and the whole crop is endangered.

It will sometimes be observed, when the light falls more directly on one side of the hurdle than the other, that the worms will incline to leave that side and become crowded on the opposite, when the hurdle should be turned around.

Up to the last moulting it is best to feed the worms entirely upon the leaves of the *multicaulis*, after which the Canton or white Italian should be used if a full supply can be obtained — the former being consumed with greater avidity, and the accumulation of litter is consequently less. The Canton and Italian produce the heaviest cocoon, while the *multicaulis* yields a finer and stronger fibre. In pursuing this course the advantages of both are in some degree secured.

The worms should be removed from their litter immediately after each moulting, and in their fourth age the hurdles should be cleaned a second time, and after the last moulting they should be removed at least every second day.

Where nets are not used in the last ages, the worms are changed by laying over them the small branches of the mulberry.

Recently branch-feeding, as it is termed, has been introduced with some success, and with great economy of time; in the last ages of the worms care should be taken to lay the branches as evenly as possible, especially where it is designed to use the twine hurdles, otherwise it will be difficult for the worms to ascend through the netting.

When the worms are about to spin they present something of a yellowish appearance; they refuse to eat, and wander about in pursuit of a hiding-place, and throw out fibres of silk upon the leaves. The hurdles should now be thoroughly cleaned for the last time, and something pre-

pared for them to form their cocoons in. Various plans have been proposed for this purpose. The lath frames, before described, I prefer. They are used by resting the back edge of the frame upon the hurdle, where the two meet in the double range, and raising the front edge up to the underside of the hurdle above, which is held to its place by two small wire hooks attached to the edge of the hurdle.

A covering of paper or cloth should be applied to the lath frames. In using the hurdles and screens I remove the screen from under the hurdle, turning the underside up, and letting it down directly upon the winding-frame. This affords double the room for the worms to wind in. Lath frames of this description have advantages that no other fixtures for winding possess that I have ever seen tried. The frame resting upon the backside of each hurdle renders this side more dark, which places the worms instinctively seek when they meet with the ends of the laths, and immediately ascend to convenient places for the formation of their cocoons. From these frames the cocoons are gathered with great facility, and free from litter and dirt, and when they are required they are put up with great expedition.

Where branch-feeding has been adopted by some, no other accommodation has been provided for the winding of the worms than that afforded them by the branches from which they have fed. This is decidedly objectionable, as the worms are always disposed to rise until their course is obstructed above. When this is not the case they wander about for hours upon the tops of the branches, and only descend after their strength becomes exhausted, and the result is the production of a crop of loose, inferior cocoons. Next to lath frames, small bunches of straw afford the best accommodation for this purpose. Rye straw is preferred. Take a small bunch, about the size of the little finger, and with some strong twine tie it firmly about half an inch from the butt of the straw; cut the bunch off about half an inch longer than the distance between the hurdles.

They are thus placed upright with their but-ends downward, with their tops spreading out, interlacing each other, and pressing against the hurdles above. They should be thickly set in double rows about sixteen inches apart across the hurdles. These may be preserved for a number of years.

After the most of the worms have arisen, the few remaining may be removed to hurdles by themselves. In three or four days the cocoons may be gathered. While gathering, those designed for eggs should be selected. Those of firm and fine texture, with round, hard ends, are the best. The smaller cocoons most generally produce the male, and those larger and more full at the ends the female insect. Each healthy female moth will lay from four to six hundred eggs. But it is not always safe to calculate on one-half of the cocoons to produce female moths. Therefore, it is well to save an extra number to insure a supply of eggs.

The cocoons intended for eggs should be stripped of their floss or loose tow, which consists of irregular fibres, by which the worm attaches its work to whatever place it is about to form its cocoon. These should be placed on hurdles, in a thin layer, and in about two weeks the moths will come out; always in the forepart of the day, and generally before the sun is two hours high. If laid upon a net hurdle (which is best) they will immediately fall through the meshes and remain suspended on the under side, where they are not liable to become entangled in the cocoons. As soon as the male finds the female they become united. They should be taken carefully by the wings, in pairs, and placed upon sheets of paper, to remain until near night, when the female will be anxious to lay her eggs. Then take each gently by the wings, and separate them, placing the females at regular distances—about two inches from each other—upon sheets of paper or fine cotton or linen cloth; these should hang over a line, or be tacked to the side of the house. In two or three nights the moths will complete their laying, when they should be

removed from the papers or cloths. Frequently the males appear first in the greatest numbers, some of which should be reserved each day in case there should afterward be an excess of females. They should be shut out from the light, otherwise they are liable to injure themselves by a constant fluttering of their wings. The female is largest, and seldom moves or flutters.

Killing the chrysalides. — After the cocoons have been gathered, those that are intended for sale or for future reeling should be submitted to some process by which the moths will be killed, otherwise they will perforate and spoil the cocoons. This is done by various methods. The most simple and convenient is to spread them thinly on boards, and expose them to the direct rays of the sun. In a hot day many of them will be killed in a few hours; but they must be stirred occasionally, or some will be liable to escape the heat, and afterward come out. At Economy, they place them in an air-tight box containing about ten bushels (the box should always be full, or if not, a partition is fitted down to the cocoon), sprinkling evenly through the whole, beginning at the bottom, about three ounces of camphor slightly moistened with alcohol, and finely pulverized. The box is then closed, and the seams of the top covered by pasting strips of paper over them. They remain in this way about three or four days. They are then spread out thinly in an upper loft to cure, where they should be occasionally stirred. It will require some weeks to thoroughly cure them. Before camphoring, the dead and bad cocoons must be taken out, otherwise they will spoil the good ones.

When it is convenient, it is best to reel as many of the cocoons as possible immediately after they are gathered, as they reel much more freely before they are exposed to the sun or dried.

Succession of crops. — Preservation of eggs.—Repeated attempts have been made to feed a succession of crops of worms throughout the entire season from the same stock of eggs. In most instances success has failed to attend

these efforts. When proper means are employed, and due care observed, the eggs may be preserved, and worms successfully raised until the feed is destroyed by the frost. In many years experience I have never failed in this respect.

In the spring of 1840 I communicated to Miss Rapp, of Economy, my method of preserving eggs, which she immediately adopted, and has pursued it until the present time with perfect success, feeding from eighteen to twenty-five crops each year.. The following is an extract of a letter from the postmaster at Economy, dated January 19, 1843:

"Between May and September we raised near two millions of worms, in eighteen sets, of near equal numbers, about a week apart, producing three hundred and seventy-one bushels of cocoons. The last crop hatched the 9th of September, and spun the 10th of October. We found no difference in the health of the different sets. We are of the opinion that the late keeping of the eggs does not bring disease on the worms if they are kept right, and gradually brought forward as they ought to be."

It may be remarked that the qualities of the mulberry leaf are such in the latter part of the season that as heavy cocoons will not be produced as in the first. A bushel of the first crop raised at Economy, in the season referred to, produced twenty-three and a quarter ounces of reeled silk, and the last crop, wound in October, but nineteen ounces. About one month of the best part of that season of feeding was lost by the severe frost that occurred on the 5th of May, which entirely killed the young leaves, and must have materially injured the crop of the season.

My method of preserving eggs is to place them in the ice-house in February, or early in March, or sooner if the weather is warm. For this purpose a box or square trunk is made, extending from within one foot of the bottom of the ice to the top. This may be made in joints, so that as the ice settles the upper joints may be removed. The eggs should be placed in a tin box, and this enclosed in a wood one, and suspended in the trunk near the ice. The communication of warm air should be cut off by fill-

ng the opening with a bundle of straw or hay. The eggs hould be aired for a few minutes as often as once in one r two weeks, always choosing a cool, dry morning; when elections for succeeding crops may be made these should e placed in another box, and gradually raised in the trunk or several days, avoiding a too sudden transition from the ce to the temperature of the hatching-room.

The ice-house at Economy is connected with the cellar, he bottom of the former being eighteen inches below that f the latter. A long wooden box, extending into the ice-louse, level with the bottom of the cellar floor, contains all he smaller boxes of eggs. The door of the box opening n the cellar is kept well closed to prevent the admission f warm air. They employ another ice-house, sunk deep n the cellar, with shelves gradually rising from the ice up o the top of the ground, upon which the eggs of succeed-ng crops are placed, and raised one shelf higher every lay until they are taken into the hatching-room. The past eason they have hatched about *five ounces* of eggs, or one undred thousand worms every four days.

Diseases of the silk-worm.—The silk-worm, like every other nimal or insect, is liable to disease, and premature death. European writers have enumerated and described six par-icular diseases to which it is subject. But in our more congenial climate nothing is wanting to insure a healthy tock of silk-worms, and a profitable return from their abors, but to give them sufficient room, a regular and full upply of suitable food, a strict regard to cleanliness, and a roper ventilation of their apartments.

In excessively hot, damp, or sultry weather, in the last ge, the disease known as the *yellows* sometimes occurs. Where open feeding is adopted, some fine *air-slaked lime* nay be sifted on the worms once or twice a day *before feed-ng*, and the diseased and dead worms picked out and hrown away. In a regular cocoonery, properly ventilated nd supplied with an air-furnace, dry air should be made o circulate freely. But if the temperature is above 80° or 35° the ventilating apparatus should be constantly employed

until a change of weather occurs, or the disease disappears.

A feeding-house should be so arranged as to cut off all communication of rats and mice from the worms and the cocoons.

Reeling.—We have now arrived at another branch of the silk business, which more properly comes under the head of manufacturing. Every farmer who engages in the silk culture, in order to avail himself of an additional profit should provide his family with a suitable reel, by the use of which, after a little experience, he will be enable to offer his silk in market in a form that will greatly enhance its value, and much reduce the trouble and expense of transportation. Reels can now be procured in almost any of the principal cities at a small cost, or they can be made by any ingenious farmer or carpenter. The reel now uniformly used is that known as the Piedmontese.

All attempts to improve this reel in its general principles, I believe, have failed. At Economy, however, they have made an addition which may be found useful. It consists of two pairs of whirls, made of wire, in the form of an aspel to a reel, about four inches long, and two and a half inches across from arm to arm, making the circumference about six inches. These whirls are set in an iron frame, and run *each* upon two points or centres. Each pair is equidistant, on a direct line, about eight inches apart, between the first guides and those on the traverse bar, instead of making the usual number of turns around each thread as they pass between the guides on the reel. With this arrangement each thread is taken from the basin and passed through the first guides, then carried over and around the two whirls, and where they pass each other on the top the turns are made necessary to give firmness to the thread, then passing directly through the guides in the traverse bar to the arms of the reel, making each thread in reeling independent of the other. This enables the reeler, when a remnant of cocoons are to be finished on leaving the work, to unite both threads into one, retaining the necessary size, whereas both would be too fine if continued on the reel in the ordinary manner.

Directions for reeling.—In family establishments a com-
non clay or iron furnace should be procured, to which hould be fitted a sheet-iron top about twelve inches high, vith a door on one side, and a small pipe on the opposite ide to convey off the smoke. This top should retain the ame bevel or flare as the furnace, so as to be about twenty nches in diameter at the top. The pan should be twenty nches square, and six inches deep, divided into four apart-nents, two of which should be one inch larger one way han the others. They should all communicate with each ther at the bottom. In large filatures a small steam-ngine to propel the reels, etc., and to heat the water for eeling would be necessary.

Before the operation of reeling is commenced the co-oons must be stripped of their floss, and assorted into hree separate parcels, according to quality or of different legrees of firmness. The double cocoons, or those formed by two or more worms spinning together, the fibres cross-ng each other, and rendering them difficult to reel, hould be laid aside to be manufactured in a different nanner.

After the cocoons have been assorted as above directed, he operation of reeling may be commenced. The basin hould be nearly filled with the *softest* water, and kept at a proper heat by burning charcoal, or some other convenient nethod of keeping up a regular heat. The precise tempera-ure cannot be ascertained until the reeling is commenced, owing to the different qualities of the cocoons. Those of he best quality will require a greater degree of heat than hose of a more loose and open texture; hence the import-ance of assisting them. Cocoons also require less heat, and reel much better when done before the chrysalides are killed and the cocoons become dried.

The heat of the water may be raised to near the boiling point (it should never be allowed to boil), when two or three handfuls of cocoons may be thrown into one of the large apartments of the basin, which must be gently pressed under water for a few minutes with a little brush made of

broom-corn, with the ends shortened. The heat of the water will soon soften the gum of the silk, and thereby loosen the ends of the filaments; the reeler should then gently stir the cocoons with the brush until the loose fibres adhere to it; they are then separated from the brush, holding the filaments in the left hand, while the cocoons are carefully combed down between the fingers of the right hand as they are raised out of the water. This is continued until the floss or false ends are all drawn off, and the fine silk begins to appear; the fibres are then broken off, and laid over the edge of the basin. The floss is then cleared from the brush, and laid aside as refuse silk, and the operation continued until most of the ends are thus collected.

If the silk is designed for sewings, about twenty-five fibres should compose a thread; if intended for other fabrics, from eight to fifteen should be reeled together. The finest silks should always be reeled from the best cocoons. The cocoons composing the threads are taken up in a small tin skimmer made for the purpose, and passed from the large apartment of the basin to those directly under the guides. As the ends become broken they are passed back into the spare apartment, where they are again collected to be returned to the reel. The requisite number of fibres thus collected for two threads are passed each through the lower guides. They are then wound around each other two or three times, and each carried through the two guides in the traverse bar, and then attached to the arms of the reel. The turning should now be commenced with a slow and steady motion until the threads run freely. While the reel is turning, the person attending the cocoons must continually be adding fresh ends as they may be required, not waiting until the number she began with is reduced, because the internal fibres are much finer than those composing the external layers. In adding new ends the reeler must attach them, by gently pressing them with a little turn between the thumb and finger, to the threads as they are running. As the silk is reeled off the chrysalides should be taken out of the basin, otherwise

ıey obscure and thicken the water, and injure the color ıd lustre of the silk. When the water becomes dis- ɔlored it should always be changed.

If in reeling the silk leaves the cocoon in burrs or unches, it is evident the water is too hot; or when the ıds cannot be easily collected with the brush, or when ɔund not to run freely, the water is too cold.

A pail of cold water should always be at hand, to be ided to the basin as it may be required. When the ɔcoons yield their fibres freely, the reel may be turned ith a quicker motion. The quicker the motion the noother and better will be the silk. When from four to x ounces have been reeled, the aspel may be taken off that ıe silk may dry. The end should be fastened so as to be ɜadily found. Squeeze the silk together, and loosen it pon the bars, then on the opposite side tie it with a band f refuse silk or yarn, then slide it off the reel;. double, ıd again tie it near each extremity.

The quality of the silk depends much upon the art and ꝁilful management of the reeler. All that is required to ɜnder one perfect in the art of reeling is a little *practice*, ccompanied at the beginning with a degree of *patience*, ıd the exercise of *judgment* in keeping up the proper tem- erature of water, and the threads of a uniform size.

Manufacture of perforated cocoons.—The perforated and ouble cocoons can be manufactured into various fabrics, ıch as stockings, gloves, under-shirts, and the like. Be- ɔre the cocoons can be spun they must be put into a clean ag made of some open cloth, and placed in a pot or ket- e, and covered with soft water, with soap (hard or soft) dded sufficient to make a strong suds, and boiled for about ıree or four hours. If they are required to be very nice nd white, the water may be changed and a small quantity ıore of soap added, and again boiled for a few minutes. ıfter they are boiled they may be hung up and drained; hey should then be rinsed while in the bag, in fair water, nd hung out to dry, without disturbing them in the bag. Vhen completely dry they may be spun on the common

flax-wheel by first taking the cocoon in the fingers and slightly loosening the fibres that become flattened down by boiling, and then spinning off from the *pierced end.* The silk will run entirely off, leaving the shell bare. The double cocoons may be spun in the same manner, but should be boiled separately.

A species of edible mulberry is planted pretty generally for feeding hogs. I am informed that it continues to bear during several months, from April to July or August, and is considered highly advantageous. This is called the *Ever-bearing mulberry.* The following account I obtain from the Southern Field and Fireside:

Ever-bearing Mulberries.—There are now three varieties of ever-bearing mulberries presented to us for selection or for general adoption.

Downing's Ever-bearing is a seedling of the *Multicaulis*, which it resembles in wood and foliage. It is therefore necessarily somewhat tender, and not suited to a more northern climate. Mr. D. has given us an ample description of its fruit in his Fruit Trees of America, and merits much credit for originating so excellent a fruit.

Herbemont's or Hicks' Ever-bearing is a much hardier variety, and superior to the preceding in size and quality of its fruit, which is produced during a considerably larger period of time. It is a prodigious bearer; the berries are usually nearly two inches in length, sweet and delicious. At the South the fruit continues to ripen from the 25th of April until the 15th of August, and here at the North the crop extends to a late period in the autumn. This tree has dark red wood, and indented leaves, very distinct from Downing's.

White Ever-bearing, sweet berries, partakes considerably of the character of the white Italian. It grows vigorously, and yields immense quantities of fruit.

The first two varieties have been in fruit with us this season. Of Downing's, from a young tree, we gathered but a few berries, of which we preferred the more vinous and decided flavor to that of the Hicks. The latter does not

materially vary in quality from the common wild species, of which it is a variety, differing in its extended period of bearing. Our young tree, of about twice the age of Downing's, began to ripen the first of May, and has just stopped fruiting for the season. The fruit is worth growing on plantations for poultry and swine, as it is very prolific. A mulberry orchard of this kind would furnish the latter a full supply of food for about three months. It is to be found at all nurseries, and we venture to commend it to our agricultural friends as a valuable farm crop for the cheap rearing of good hogs.

The juice of the mulberry is used to give a dark tinge to confections. When properly fermented the fruit yields a pleasant vinous liquor, mulberry wine, and is mixed with apple juice to form mulberry cider. The bark of the root is a powerful cathartic. Farmer's Encyc.

Morus rubra, L. Mulberry. Grows along rivers and swamps; vicinity of Charleston; Richland, Prof. Gibbes; Florida. Fl. March.

U. S. Disp. 463. The fruit is laxative and cooling, and a grateful drink and syrups are made from it, adapted to febrile cases. The bark of the mulberry can be converted into cordage, ropes, and brown paper. The inner bark of the root of the black mulberry, in doses of from half to a whole teaspoonful of the powder, is said to act as an excellent purgative. A syrup of the ripe fruit is an excellent laxative for children. A tincture of the inner bark of the root is considered a valuable laxative bitter.

Tartaric acid is obtained from the mulberry, the grape, currant, etc. It is almost always found in vegetables combined with potassa, with which it forms a nearly insoluble salt; it is the union which occasions it to be so easily precipitated from the liquors in which it is contained, especially when they ferment. The coats of tartar which are found deposited upon the sides of casks are a combination of tartaric acid, potassa, and extracted matter (Chaptal).

See Pereira, and treatises on chemistry for mode of formation of Cream of tartar.

Citric acid, also, is found in the skins of the red currant, of wild plums, cherries, strawberries, and raspberries. In these it is found united with malic acid. The orange and lemon, of course, furnish it in the largest proportion.

The process adopted by Scheele for obtaining and crystallizing citric acid is to saturate the juice with lime, the insoluble salt, thus formed, being decomposed by sulphuric acid diluted with water. The liquor is then evaporated, and the acid obtained in a crystalline form. See Chaptal, Ure, works on chemistry and mat. medica, Pereira, U. S. Dispensatory, etc.

The production of citric acids in the warmer portions of the Southern Confederacy is quite practicable, as the lemon grows abundantly.

Citric acid supplies the place of lemon juice for domestic purposes, and in the arts, by its being freed from mucilage, which renders the juice liable to undergo speedy change, and from a diminution of its bulk by concentration (Chaptal).

To give a flavor to food, citric acid is preferable to vinegar, on account of the aromatic principle it contains. Dissolved in water, it forms a very wholesome drink; "about thirty grains of the acid, dissolved in a pint of water, and sweetened with sugar, composes an excellent lemonade." From its refreshing and antiputrescent properties, it is invaluable during the hot months, and especially as an article for sea-stores of vessels in warm latitudes (Chaptal); and particularly for the prevention of scurvy. "Citric acid is also particularly useful in the arts;" like oxalic acid, "it is employed in forming *reserves* in printed goods, and in removing spots of ink or rust." Chaptal. See, also, acetic acid, vinegar, etc. See Chaptal, Ure, and treatises on chemistry, and orange, "*Citrus*," in this volume.

Ell., in his Sketches of the Botany of S. C., says the wood is preferred, in the building of boats, to that of any

other tree, except the red cedar (*Juniperus Virginiana*). The other woods suitable for ship-building found with us are, the live oak for the timbers and knees, and the cypress, cedar, willow, and several species of pine for the timbers as well as the spars—being preferred on account of their strength, lightness, or peculiarity of growth.

Wilson says of this tree that the wood is fine grained, compact, strong, and solid, and by many persons is esteemed fully equal to the locust. It is employed in naval architecture at Philadelphia and Baltimore, for the upper and lower parts of the frame, for knees and floor timbers, and for tree-nails; it is hardly inferior to the locust, but is scarce in the ship-yards. For posts it is considered nearly as lasting as the locust, but it grows more slowly, and requires a richer soil. From experiments made in France it was ascertained that the leaves were not as good for the silk-worm as those of the *M. alba*. A much less quantity was obtained than from worms fed on the white mulberry, and there was a greater mortality. Rural Cyc. See, also, my article in August number, 1861, of DeBow's Review.

Broussonetia papyrifera, the paper mulberry of our yards, belongs to this family (Chapman). Fustic is also got from the same family. As the paper mulberry is planted in this country, I will insert the account given by Wilson of its uses. The islanders of the Pacific make a kind of clothing from this tree, in the following manner: twigs of about an inch in diameter are cut and deprived of their bark, which is divided into strips, and left to macerate for some time in running water; after the epidermis has been scraped off, and while yet moist, the strips are laid out upon a plank in such a manner that they touch at their edges, and two or three layers of the same are placed upon them, taking care to preserve an equal thickness throughout. At the end of twenty-four hours the whole mass is adherent, when it is removed to a large flat and perfectly smooth table, and is beaten with little wooden clubs till it has attained the requisite thickness. It is easily torn, and requires to be

washed and beaten many times before it acquires its full suppleness and whiteness. The paper which is used in Japan, and many other countries in the East Indies, is made from this plant; for this purpose the annual shoots are cut off after the fall of the leaves, tied in bundles, and boiled in water mixed with ashes; after which the bark is stripped off by longitudinal incisions, and deprived of the brown epidermis. The bark of the more tender shoots furnishes a very white paper for writing. Hair pencils must be used in writing on this paper. Silk-worms eat the leaves of this tree also. Rural Cyc.

Ficus carica. Fig. Ex. Cult. Flourishes in South Carolina.

Shec. Flora Carol. The fruit is well known; the juice has been substituted for sympathetic ink, as the characters written with it are not visible till exposed to the sun. The decoction of the green branches and leaves imparts a deep gold color, of a brown shade, to cloth prepared with a solution of bismuth. We have heard it stated as a curious fact, that there is but one male fig in America, which grows in Louisiana! Some botanists describe the plant as containing both stamens and pistils within the fruit or pericarp.

Figs are excellent pabulum for vinegar. Vinegar should be constantly replenished with over-ripened figs.

The following easy process of making white vinegar from honey may not be amiss, even in a work of this kind, which professes to teach all economical modes of becoming independent of foreign supplies. It is obtained from Wilson's Rural Cyc. The materials can be easily obtained. Four very good kinds of household vinegar, perfectly suitable for pickling, and for other domestic purposes, may easily be made from respectively—honey, brown sugar, British wines, and sour ale. First, as to honey or white vinegar: dissolve three-quarters of a pound of honey in rain-water, and put it into a seven-gallon cask, with a quart of malt spirit; shake it well, then fill up the cask with rain-water; shake it well, and keep near the kitchen fire, where it must

stand without being moved or shaken. Let it remain five months in this place, and the vinegar will be made. Draw it off by piercing the lower part of the cask, and let it run till the concretion which is formed at the top, and is termed "mother of vinegar," begins to appear. You may then begin the process again without cleaning the cask. Properly toasted bread, saturated with yeast, would take the place of the malt spirit referred to above. See article "Vinegar" in Rural Cyc. for other methods.

The fruit is well known. Even this, when properly prepared for market in the warmer portion of the states of our Confederacy, constitutes an article both for export and for home consumption. Many persons believe implicitly in the power of the atmosphere about this tree to render meat tender. Our "Southern matrons" now put up this fruit in a most palatable shape for winter use, dried in the sun, after being boiled in a syrup. The celestial fig is the best for this purpose. Molasses can also be made from the fig and watermelon. Mr. C. H. Owen, of Charleston, sends a specimen to the Charleston Courier, made from the white fig. One peck yielded three pints. From a bushel he obtained seven quarts, according to the following directions:

"Wash the figs, then put them in a porcelain vessel; cover with pure water, boil carefully one hour. When cool, strain through a muslin cloth; then boil again until it is boiled down to a proper consistency, which you can easily tell by dipping up a spoonful and cooling. The above is all the preparation necessary. In boiling for the last time, take the scum off."

"F J. S." a correspondent of the Charleston Mercury, writes as follows on "our resources:"

"You spoke, in the article above alluded to, of different coloring substances. The juice of the skin of our *blue fig* is abundant, and of a deep, brilliant red color; a half-page written with it a few days since had the appearance of having been done with red ink.

The *pomegranate*, which grows in great abundance in Southern Georgia, furnishes, in the rind of the fruit, a jet-

black fluid, which writes very smoothly, and retains its jetty hue. The metallic pen used may darken its color."

I have seen blue cakes resembling indigo, intended for dyeing, and marked fig blue—probably extracted from the skins of the fig. The fig makes excellent pipe-stems. Since the war the stems of the fig and titi (*Cliftonia*) have formed favorite materials for pipe-stems, perforated with a heated wire.

Ulmaceæ. (*The Elm Tribe.*)

Ulmus fulva. Slippery elm. I have observed it in Fairfield district. It is sometimes found lower down.

Am. Herbal, 139; Frost's Elems. Mat. Med. and Therap. 228; U. S. Disp. 727; Dr. McDowell's Med. Exam. 244; West. Jour. Med. and Phys. Sc.; Michaux, Fl. Americana, i, 172; and N. Am. Sylva, iii, 89; Griffith, Med. Bot. 563. A decoction of the bark was much used by the Indians in the cure of leprosy. It is an excellent demulcent employed as an emollient application, and internally is especially recommended in suppression of urine, inflammation of the bladder, dysentery, and diarrhœa. A decoction made of this, combined with the root of the sassafras, and guaiac, is esteemed as a valuable drink to increase cutaneous transpiration, and to improve the tone of the digestive organs. Griffith considers it a good substitute for acacia, and he has witnessed its beneficial effects, externally applied, in obstinate cases of herpetic and syphilitic eruptions; he is inclined to ascribe higher curative powers to it than are generally admitted. It forms a good vehicle for enemata, where a mucilaginous fluid is required. The bark, cut in the form of a bougie, has been used in dilating sinuses and contractions of the urethra. The substance exuding from the bark is called *ulmin.* It should be largely collected for the use of our soldiers—suitable wherever a highly mucilaginous substance is required. See "*Sesamum.*" This is the best wood we have for blocks, and is excellent for rails, as it splits easily, and is of long duration. It is more durable than the white elm.

Ulmus Americana, Mx. White elm. Vicinity of Charleston.

Mér. and de L. Dict. de M. Méd. vi, 799; Coxe, Am. Disp. 611; Phil. Med. Mus. 11. The *U. fulva* probably referred to.

The wood of the white elm, like that of the common European elm, is of a dark brown; and cut transversely, or obliquely to the longitudinal fibres, it exhibits the same numerous and fine undulations, but it splits more easily, and has less compactness. It is, however, used at the North for the naves of coach-wheels, because it is difficult to procure the black gum. In Maine it is used for the keels of vessels. Its bark is said to be easily detached during eight months of the year; soaked in water, and suppled by pounding, it is used in the Northern states for the bottoms of common chairs. Michaux.

Ulmus alata, Mx. Wahoo. Rich soils; Florida; South and North Carolina.

The wood is fine grained, more compact, heavier, and stronger than that of the American white elm. It is employed for coach-wheels, and is even preferred to the black gum, as being more hard and tough. Michaux. Farmer's Encyc.

From the Montgomery Advertiser (1862) I obtain the following:

" *Wahoo rope.*—We have seen a specimen of rope made of wahoo bark, by Mr. T. J Howard, of this county. Mr. Howard has used the wahoo rope with great success in bagging cotton on Col. Baldwin's place, and we can safely recommend his contrivance to the attention of planters. The common impression is that the bark is not in good condition except in the spring of the year. This is a mistake. It can be used to great advantage at this season in bagging cotton. The manner of using the rope made of wahoo bark is altogether similar to that which has been in ordinary use."

Celtis occidentalis, L. Sugar-berry. A noble tree, growing along the margin of streams, and in damp lands; collected in St. John's; vicinity of Charleston, Bach; Newbern. Fl. June.

Mér. and de L. Dict. de M. Méd. ii, 170; Fl. Med. i, 90; Griffith, Med. Bot. 563. It yields a gum resembling that of the cherry tree; the root and leaves are somewhat aromatic, and were used by the Indians in syphilis. The berries have a sweet and pleasant taste.

The wood of this tree resembles closely, says Wilson, that of the *C. australis*. The timber of the latter is exceedingly durable, and was formerly employed by British coachmakers for making the frames of their vehicles; and by the Italian musical-instrument-makers for making flutes and pipes. Rural Cyc.

MYRICACEÆ. (*The Gale Tribe.*)

Aromatic and sometimes astringent.

Myrica cerifera, L. Wax myrtle. Grows abundantly in the swamps of the lower country; Newbern. Fl. May.

Ell. Bot. Med. Notes, ii, 278; Matson's Veg. Pract. 198; U. S. Disp. 200; Pe. Mat. Med. and Therap. 786; Big. Am. Med. Bot. iii, 32; Am. Journal Med. Sci. ii, 313; Bergii, Mat. Med. ii, 541; Nicholson's Journal iv, 187; Kalm's Travels, i, 129; Dana in Silliman's Journal 1; Thachal's U. S. Disp. 288; Mér. and de L. Dict. de M. Méd. iv, 531; De Cand. Essai, 772; Lind. Nat. Syst. Bot. 180. The root is a powerful astringent, and a decoction is employed in diarrhœa, dysentery, hemorrhage from the uterus, in dropsies which succeed fevers, and as a gargle in sore throat. It is also given to some extent by the vegetable practitioners. Griffith states (Med. Bot. 583) that the bark of the root is also stimulant and acrid, and in doses of a drachm, causes a sensation of heat in the stomach, followed by vomiting and sometimes diuresis. The powder is an active errhine, and the leaves have some celebrity in domestic practice, as being antispasmodic, antiscorbutic, and astringent. Dr. Dana found the powdered root powerfully sternutatory. Bigelow

says that the bark and leaves contain gallic acid, tannin, resin, and a small quantity of mucilage. The berries afford a large amount of wax, which rises to the surface when they are boiled, not remarkable for adhesiveness or unctuosity. Dr. Bostock considers it a fixed, vegetable oil, rendered concrete by oxygen; and by the experiments of Dr. Dana, it constitutes one-third of the whole berry. It is employed for candles, emitting a fragrant odor, and it also forms the basis of a fine soap. It appears to possess some astringent and slightly narcotic properties, and has been administered by Dr. Fahnestock in an epidemic of typhoid dysentery. He gave it in doses of 1 to 2 drachms, and he is of opinion that its active principle resides in the green coloring matter. Am. Journal Med. Sci. ii, 313. Rafinesque states that a tincture of the berries, with heracleum, is beneficial in flatulent colic. De Cand., Essay upon the Louisiana Myrtle (in French); see Ann. de Chim. xliv, 141, and xlvi, 77; C. L. Cadet, Mem. on the Myrtle of Louisiana and Pennsylvania, Paris; Thiebault de Bernaud, Mém. sur le cirier, ou arbre à cire, Paris, 1810. See my own experiments upon the applicability of the leaves as a substitute for oak bark, under "*Liquidambar*," sweet-gum.

"The northern nations formerly employed this plant in place of hops, and it is still in use for that purpose in some of the western isles: unless it is boiled a long time it is reported to occasion the headache." Nicholson also says, in his Encyclopædia, of the *M. cerifera*, that "it is used in tanning calf-skins; gathered in autumn, it will dye wool yellow, for which purpose it is used both in Sweden and in Wales; the Welsh lay branches of it upon and under their beds to keep off fleas and moths." Boussingault, in his Rural Chemistry applied to Agriculture, 1859, says of the wax-bearing myrtle: "The fruit yields as much as twenty-five per cent. of wax, and a single shrub will yield from twenty-four to thirty pounds of berries. The crude wax is green and brittle, and to be made into candles requires the addition of a certain quantity of grease." Proust discovered that vegetable wax formed part of the green fecula of

many plants. In the common cabbage it occurs in large quantity. Oleine is said to predominate in the fluid vegetable oils. See, on this subject, *Styllingia sebifera.* The berries of the Pride of India (*Melia*) also yield an oil when dried and boiled. Wax has also been collected by scraping the stalk of the sugar-cane. See "*Sorghum,*" in this volume.

I have repeatedly seen the wax produced from the myrtle in large amounts. The berries are boiled, and the wax rises on the surface of the water. The boiling should be continued a long time, and the berries stirred and bruised. The wax may be remelted to purify it. Four pounds of this will make forty pounds of soap. The candles made of it are dark green in color. Candles and soap were made in considerable amounts by the ladies in the low country of South Carolina during the autumn of 1861 — fifteen to twenty dozen candles in one household.

Wilson, in his Rural Cyc., quotes Hamilton, who says that the wax, after being skimmed off the water, should be strained through a coarse cloth to free it from foreign matter. When no more wax rises, the berries are removed with a skimmer and a fresh supply put into the same water, taking care to add boiling water to supply the place of that evaporated during the process. The wax should be dried, and melted again to free it from impurity. See Charles Louis Cader's Memoir, inserted in the Annales de Chimie, who said that the myrtle had been successfully cultivated near Berlin, and Hamilton recommends its cultivation in England for its wax-producing properties. Abundant in the Confederate States; only a condition of war and blockade has induced us to use it.

"J. B." communicates the following to the Charleston Courier, from a writer under the signature of "Economy," from St. Paul's parish, S. C. It is also printed in F S. Holmes' Southern Farmer, p. 236:

Large amount of Soap produced from Myrtle Wax.—I find the following recipe for making soap from myrtle wax (*Myrica cerifera*) in an old number of the Southern Agricul-

turist. As one of the complaints of soap-makers is the difficulty and expense of obtaining the grease, it will be well for us to avail ourselves of a production of nature, found abundantly in our lower country. The fruit is now matured, and may be had in abundance for the picking. I saw, this day, very good candles made of myrtle wax. I trust our planters, residing in the vicinity of the myrtle, will profit by these advantages before the season for picking has passed:

"To three bushels and a half of common wood ashes add half a bushel of unslaked lime. This being well mixed together, put into a cask capable of containing sixty gallons, and fill up with water. In forty-eight hours the lye will be strong enough to float an egg. Then draw off, and put from six to eight gallons of it into a copper kettle capable of containing twenty-five gallons. To this add only four pounds of myrtle wax. Keep constantly boiling for six hours. For the first three or four hours pour in occasionally a supply of strong lye, the whole frequently well stirred with a ladle. After six hours boiling, throw two quarts of common large grain salt into the kettle; leave one hour more to simmer over a slow fire. The liquor must be placed in tubs to cool for twenty-four hours. Take out the soap, wipe it clean; put it to dry.

"The produce of this soap when it was weighed the next day was found to be forty-nine pounds of good, solid soap, from the materials and by the process above mentioned. At the end of six weeks the soap had only lost a few pounds from the evaporation of its watery particles.

"In many parts of our state the myrtle tree is abundant, and from three pecks to a bushel may be gathered from a hand per day. Would it not be worth the while of the planters to attend to this matter? I am sure it would save them many a dollar."

A correspondent, "T," of the Charleston Courier writes as follows:

Soap and Candles.—We have been so long dependent on

our Yankee enemies for supplies of the above named articles of universal use that we have forgotten that we can make them ourselves. To our shame we admit that even on our plantations in the low country and seaboard, abounding in materials for making the best candles in the world, millions of pounds have been annually permitted to *mature and decay unused.* The low bush myrtle, indigenous to our coast from Virginia *ad libitum* south, the berries of which are now mature, will afford a supply of wax; that, with the addition of one-third tallow, will furnish candles sufficient to light every house in the Confederacy for the next year, and put a stopper on the exorbitant extortion now practised on the people for that article. So, also, on every plantation, nay, in almost every kitchen, the monthly waste of ashes and grease, with the addition of a little lime and salt, and the labor of one person for one day, will make soap enough to cleanse every man, woman, and child, and their clothing. Now, why should we any longer pay thirty cents a pound for soap, and sixty cents for candles?

Since my examination and recommendation of the myrtle leaves as a tanniniferous agent, I see that it has been used by Mr. J. Commins, of Charleston, in tanning leather. I find that the berry is also highly astringent.

I had observed, also, an unusual amount of astringency in the berries of the myrtle. The water in which they are boiled, with copperas, is used as a dye. I have seen an excellent dark brown with very little copperas. If walnut leaves, bark, or the rind of the fruit is added the color is very black. I am informed in St. John's, Berkley, S. C., that a *blue* dye is obtained without a mordant, by using the same water repeatedly in boiling the berries for the extraction of the wax! This seems an unexpected result.

Myrica Carolinensis. Grows in dry soils; Richland, Prof. Gibbes; collected in St. John's; Newbern.

Griffith's Med. Bot. 583. Supposed to possess similar properties with the above. It can scarcely be distinguished from the others.

JUGLANDACEÆ. (*The Walnut Tribe.*)

Juglans cinerea, L. Butternut: oil-nut. Grows in the mountains of South Carolina. Fl. April.

U. S. Disp. 710; Archives Gén. 3e série, x, 399, and xi, 10; Frost's Elems. Mat. Med. 131. "The inner bark of the root affords one of the most mild and efficient laxatives we possess." The extract was a favorite remedy in General Marion's camp during the Revolutionary war. It is very efficacious in habitual constipation, in doses of ten to thirty grains; the first acting as a laxative, the maximum purging. Big. Am. Med. Bot. ii, 115; Mx. N Am. Sylva, 160; where it is spoken of as a mild cathartic, operating without pain or irritation, and resembling rhubarb in its property of evacuating without debilitating the alimentary canal. Dr. Rush employed it during the war. Wood says it is highly esteemed in dysentery; Lind. Nat. Syst. 181. The rind of the fruit and the skin of the kernel are extremely astringent, anthelmintic, and cathartic; the oil extracted from the fruit is of a very drying nature. Mér. and de L. Dict. de M. Méd. iii, 687 (*J. cathartica*.) He remarks that the inner bark of the root is acrid and caustic, and purges, but occasions neither heat nor irritation; adapted to bilious constitutions and to dysentery; often combined with calomel. It is given to animals in a disease called "yellow water"; Bull. des Sci. Méd. Fér. xii, 338. To extract the cathartic principle, the bark is boiled in water for several hours; remove the extraneous matter, and boil down the decoction to the consistence of honey or molasses—pills may be made of this. A syrup may also be made. The bark is strongest in the early summer. The powdered leaves are rubefacient, and act as a substitute for cantharides. Coxe, Am. Disp. 365. The bark of the branches affords a large quantity of soluble matter, chiefly of the extractive kind, water seeming to be a solvent. Wetherill found in it fixed oil, resin, saccharine matter, lime, potash, a peculiar principle, and tannin. Dr. B. S. Barton, in his Collections, 23, 32, thinks it is possessed of

some anodyne property. Dr. Gray ascertained that four trees, eight to ten inches in diameter, produced in one day nine quarts of sap, from which was made one pound and a quarter of sugar, equal, if not superior to that produced from the maple. This plant is always given in the form of extract or decoction. Griffith's Med. Bot. 589; Thacher's Disp. 245; Rush's Med. Obs. i, 112; Pe. Mat. Med. and Therap. ii, 767; Lind. Med. Fl. 387 The wood of the butternut is used for the sleepers and posts of frame houses and barns, for posts, and rail fences, troughs for cattle, etc. For corn-shovels and wooden dishes it is preferred to the red flowering maples, because it is lighter and less liable to split; consequently, hollow-ware and other articles made of it sell at higher prices. In Vermont the wood is used for the panels of coaches and chaises, being well adapted for this purpose, not only for its lightness, but because it is not liable to split. It receives paint in a superior manner, its pores being very open, more so than poplar and basswood. Mx. Am. Sylva; Farmer's Encyc.

Juglans nigra, L. Black walnut. Diffused in lower and upper country of South Carolina; Newbern. Fl. June.

Mér and de L. Dict. de M. Méd. iii, 687; Griffith, Med. Bot. vi, 89. The bark is styptic and acrid; the rind of the unripe fruit is said to remove ringworms and tetter; and the decoction is given with success as a vermifuge. "A kind of bread is obtained from the fruit." In a communication received from J. Douglass, M. D., of Chester district, South Carolina, his correspondent, Mr. McKeown, informs me that a bit of lint, dipped in the oil of the walnut kernel, and applied to an aching tooth, is an effectual palliative; he has employed it for thirty years with great satisfaction.

The following appeared in one of the journals during the year 1861:

Walnut leaves in the treatment of diseases.—Dr. Negries, physician at Angiers, France, has published a statement of his success in the treatment of scrofulous disease in differ-

nt forms by preparations of walnut leaves. He has tried ralnut leaves for ten years, and of fifty-six patients, afflicted u different forms, thirty-one were completely cured, and here were only four who appeared to have obtained no dvantage. The infusion of the walnut tree leaves is made ›y cutting them and infusing a good pinch between the humb and forefinger in half a pint of boiling water, and hen sweetening it with sugar. To a grown person, M. Negries prescribed from two to three teacups full of this laily. This medicine is a slightly aromatic bitter; its effi- ;iency is nearly uniform in scrofulous disorders, and it is tated never to have caused any unpleasant effects. It ıugments the activity of circulation and digestion, and to he functions imparts much energy. It is supposed to act ıpon the lymphatic system, as under its influence the nuscles become firm, and the skin acquires a ruddier hue.

Dry leaves may be used throughout the winter, but a ɜyrup made of green leaves is more aromatic. A salve nade of a strong extract of the leaves mixed alone with ;lean lard and a few drops of the oil of bergamot is most ɜxcellent for sores. A strong decoction of the leaves is ɜxcellent for washing them. The salutary effects of this nedicine do not appear on a sudden—no visible effect may oe noticed for twenty days, but perseverance in it will effect ı cure. As walnut tree leaves are abundant in America, ınd as the extract of them is not dangerous or unpleasant o use, and scrofula not uncommon, a trial of this simple nedicine should be made. In directing attention to it ƺood results may be expected.

A gray dye may be prepared with young, unripe walnuts. The walnuts should be beaten in a mortar, boiled with water — the yarn is previously prepared with lye-water. See "*Rhus.*"

I obtain the following from a journal (1862):

To dye wool yarn a durable black without copperas.—Place ın a kettle a layer of walnut leaves, then a layer of yarn, then a layer of leaves and another of yarn, and so on till the kettle is full; pour on water till all is covered, and boil

all day. The next morning pour off the liquor into another vessel, and put fresh leaves with the yarn in layers as before, and pour the same liquor over it and boil again all day. Then hang the yarn in the air a few days, after which wash it and it will be a fine black.

The walnut leaves should be gathered in the autumn just as they begin to fall from the trees.

Both the black and white walnut possess a durable wood, and are secure from the annoyance of worms. The stem of the black walnut is easily perforated, and like the titi (*Cliftonia*) is much used for pipe-stems among the soldiers in camp. The fig is also used for the same purpose.

At a convention of gunsmiths, held at Atlanta, Ga., Aug. 29, 1861, some facts were elicited which are interesting in this connection.

Mr. Hodgkins, a gunsmith, stated "that the greatest difficulty was to get wood for the stocks; that wood of one or two years was not sufficiently seasoned. It ought to be cut twenty years. The bark should be taken off the tree at once. Some thought it best to cut the timber in the summer, others in the fall or winter." Gen. Wayne read the following from the Ordnance Manual:

"The most suitable season for felling timber is that in which vegetation is at rest, which is the case in midwinter or midsummer. Recent experiments incline to give the preference to the latter season — say the month of July; but the usual practice is to fell trees for timber between the first of December and the middle of March."

"Gen. Wayne, on being inquired of, gave it as his opinion that there was no artificial process of seasoning wood that would answer for making gunstocks.

"Mr. Esper said that maple timber could be seasoned rapidly by being boiled in oil. It prevented its cracking. It soon seasoned thoroughly, and would not spring.

"Mr. Lamb stated that walnut was the best for stocking guns, but harder to season. It required a great number of years—say twenty years, or nearly so. Maple was next, and persimmon the next. These could be seasoned by artificial process."

The reader will find some information on the felling of nber in Wilson's Rural Cyc. I have seen beautiful ılnut obtained from the roots of old trees which had died. The fruit is edible, and pleasant to the taste. The wood very compact and durable, with a black, fine grain, susptible of a high polish, and forming a valuable substitute r mahogany, from which, when seasoned and varnished, can scarcely be distinguished. It is much used in South ırolina in the manufacture of tables, stair-railings, and e inner work of houses. The writer has seen as beautiful ›ok-cases, tables, stair-railings, and cabinet-work made ›m the wood prepared on our Southern plantations, when əll seasoned, as any imported from elsewhere. The roots ,ve a peculiarly rich black color, and are useful in making ınstocks.

The trunk of a walnut tree, tapped on the 11th February, elded a sap containing some cane sugar. The saps of the camore, of the *Acer negundo*, and of the lilac tree, conined the same species of sugar; but that of the birch əe held in solution some grape sugar. In the sycamore ıd birch tree M. Biot observed an extremely interesting ct. He ascertained, on felling these trees, that the greater ›rtion of the descending sap was accumulated toward the iddle of the trunk. That of the birch tree was acid and ccharine; the sap of that portion of the trunk which was ıried in the ground contained no sugar, but a substance ›ssessing the principal characters of gum. (*Annales du [uséum d'Histoire Naturelle*, *t.* ii.) It was probably an fect of the season, for Knight states that he never could scover the least trace of saccharine matter during winter the alburnum either of the stem or of the roots of the camore. Boussingault's Rural Econ. in its relation to ıemistry, etc., Law's edition, 1857

Walnut leaves soaked in water for some hours, then iled and applied to the skins of horses and other animals, ll prevent their being bitten or worried by flies.

In Patent Office Reports, 1855, is a paper on the Persian ılnut, or Maderia nut (*Juglans regia*), which appears to be

well adapted to the climate of the Middle or Southern states. It produces an immense amount of oil and cake. It is preferred to linseed oil, and gives an excellent light. The husk of the walnut is used in dyeing woollen stuffs.

Carya amara, porcina, alba, etc. Ell. Sk. Hickory. The barks are astringent.

A dye for woollens used on the plantation is made from that of most of the species. The fruit of many of the hickory trees is pleasant to the taste, particularly the *C. alba*, shell-bark hickory, which is an article of trade. It should be spared in clearing land.

To color yellow.—"Take three-fourths of hickory bark, with the outside shaved off, and one-fourth of black oak bark done in the same manner; boil them well together in a bell metal kettle until the color is deep; then add alum sufficient to make it foam when stirred up, then put the yarn in and let it simmer a little while; take it out and air it two or three times, having a pole over the kettle to hang it on, so that it may drain in the kettle; when dry rinse it in cold water." Thornton's Southern Gardener, p. 182. The writer has seen negro clothes and other stuffs dyed on the plantations with either hickory or oak barks, either alum or commercial copperas being used. The crab-apple dyes a canary color. The hickory bark, with copperas, dyes yarns an olive color—with alum, a green—the yarns must be put in hot. The wood of the hickory yields a very fine lye when reduced to ashes, and I will include much that is said of soap under this genus. The wood is also valuable for many purposes in the mechanical arts on account of its weight, pliability, toughness, and durability. In Pennsylvania an oil is extracted from the nuts of the *C. amara*, butternut hickory, which is used for the lamp, and for other inferior purposes. I would suggest that the nuts of any species would serve, if broken and boiled, for the manufacture of soap. I insert the following from Michaux:

"*Properties and uses of hickory wood.*—The wood of all the species of hickory bears a striking resemblance, both as to

ıre and the uniform reddish color of the heart. It possesses great weight, strength, and unusual pliability and ughness. When exposed to heat and moisture it is subɔt to rapid decay, and is peculiarly liable to injury from ɔrms.

"Throughout the Middle states it is selected for the axleees of carriages, for the handles of axes and other carpenrs' tools, and for large screws, particularly those of booknders' presses. The cogs of mill-wheels are made of ckory heart, thoroughly seasoned; but it is proper only r such wheels as are not exposed to moisture; and for this ason some other wood is by many millwrights preferred. he rods which form the backs of Windsor chairs, coachhip handles, musket-stocks, rake-teeth, flails for thrashing rain, the bows of yokes, or the elliptical pieces which pass ader the necks of cattle: all these are objects customarily ade of hickory. At Baltimore it is used for the hoops of eves, and is more esteemed than the white oak, which is qually elastic, but more apt to peel off in small shreds into ie substance sifted. In the country near Augusta, in eorgia, I have remarked that the common chairs are of ickory wood. In New Jersey it is employed for shoeing edges—that is, for covering the runners or parts which ide upon the snow; but to be proper for this use it must ave been cut long enough to have become perfectly dry.

"Of the numerous trees of North America east of the llleghany mountains, none except the hickory is perfectly dapted to the making of hoops for casks and boxes. For iis purpose vast quantities of it are consumed at home, and xported to the West India islands. The hoops are made f young hickories from six to twelve feet high, without hoice as to the species. The largest hoop-poles sold at hiladelphia and New York in February, 1808, at three dolırs a hundred. Each pole is split in two parts, and the hoop crossed and confined by notches, instead of being bound t the end with twigs, like those made of chestnut. From ie solidity of the wood, this method appears sufficiently ecure.

"When it is considered how large a part of the productions of the United States is packed for exportation in barrels, an estimate may be formed of the necessary consumption of hoops. In consequence of it, young trees proper for this object have become scarce in all parts of the country which have been long settled. The evil is greater, as they do not sprout a second time from the same root, and as their growth is slow. The cooper cannot lay up a store of them for future use, for unless employed within a year, and often within six months after being cut, they are attacked by two species of insect, one of which eats within the wood, and commits the greatest ravages.

"The defects which unfit the hickory for use in the building of houses equally exclude it from the construction of vessels. At New York and Philadelphia the shell-bark and pignut hickories have been taken for keels, and are found to last as long as those of other wood, owing to their being always in the water. Of the two species, the pignut would be preferable, as being less liable to split, but it is rarely found of as large dimensions as the other.

"In sloops and schooners the rings by which the sails are hoisted and confined to the mast are always of hickory. I have also been assured that for attaching the cordage it makes excellent pegs, which are stronger than those of oak; but they should be set loosely in the holes, as otherwise, for want of speedily seasoning, they soon decay. For handspikes the hickory is particularly esteemed on account of its strength; it is accordingly employed in most American vessels, and is exported for the same purpose to England, where it sells from 50 to 100 per cent. higher than ash, which is brought also from the north of the United States. The hickories are cut without distinction for this use, but the pignut, I believe, is the best.

"All the hickories are very heavy, and in a given volume contain a great quantity of combustible matter. They produce an ardent heat, and leave a heavy, compact, and long-lived coal. In this respect no wood of the same latitude in Europe or America can be compared to them; such, at

.st, is the opinion of all Europeans who have resided in
ɜ United States.

"It has been seen by what precedes that though hickory
ood has essential defects, they are compensated by good
operties which render it valuable in the arts."

In concluding this article, Michaux recommends particu-
ly for propagation in European forests the shell-bark
ckory and the pignut hickory, whose wood unites in the
ghest degree the valuable properties of the group. He
inks, also, that the pecan-nut merits attention from pro-
oters of useful culture, not so much for its wood as for its
iit, which is excellent, and more delicate than that of the
ıropean walnut. It might probably be doubled in size,
the practice was successfully adopted of grafting this
ecies upon the black walnut, or upon the common Euro-
an walnut.

Oak and hickory bands for cotton bales.—A tie dispensing
th the use of iron or rope bands in baling cotton has been
tented. The editor of the Southern Field and Fireside
ys on this subject: "Precisely such 'ties' have been used
fasten strong hoops on tubs in distilleries and breweries
.onger time than any living man can remember. Thirty
ars ago we made a score of large tubs for tanning leather,
d tied the staves together (made of two-inch plank) as
ove described, save the teeth on the iron rings or bands.
ıe fastening is very simple, and perfectly reliable. A
ıall iron ring, formed like the capital letter D, is *the thing.*
should hold both ends of a hoop two inches wide, each
d being a half-inch in thickness; and also a wedge
ree-fourths of an inch thick. Such a hoop, made of oak,
h, or hickory, will have more than four times the strength
the rope usually employed in baling cotton. Green or
und wood is hard to break when pulled lengthwise. On
r Southern plantations oak, hickory, ash, and grape-vines
e much used in place of rope in baling hay, fodder, etc."

The following practical remarks on the manufacture of
tash and soap I introduce here in connection with the
ckory, from an editorial by Dr. Lee, in the Southern Field

and Fireside, January 18, 1862. (For "Soda" see "*Salsola*," in this book, and "*Quercus*.") The ashes we may obtain by burning corn-cobs yield more potash than any other available substance; and the alkali from this source is rapidly converted into saleratus or good soap. Corn-cobs are mentioned because we often see them wasted in quantities where hogs are fed, and where much corn is shelled. Soap-makers at the North buy all kinds of wood-ashes, and find no difficulty in making soap from them; but many Southern negroes, who make a little soap, do not understand the art under consideration. They require ashes from hickory, walnut, poplar, or some other wood rich in potash to succeed in producing good soap. The quantity of lime named in the directions given in the article we copied is two or three times larger than it need be. A peck of recently slaked lime is abundant for a barrel of ashes. Lime that has been long slaked and exposed to the air will not answer. The object of the lime is to decompose all the carbonate of potash dissolved out of the ashes, so that the pure alkali will combine, with grease or oil, to form soap. When the amount of potash in wood is small, as in pines and decayed wood, the whole of the alkali unites with carbonic acid, or some other, if free, when the wood is burnt. When ashes are kept some time, if partly caustic when first burnt from wood they part with their causticity by imbibing carbonic acid from the atmosphere, as freshly burnt lime will do. Hence, recently burnt ashes will often make soap without lime, but will not do if kept several months. As caustic lime has a stronger affinity for carbonic acid than potash or soda has, soap-makers find no trouble whatever in making soap from old ashes, or any ashes that have not been wet and washed. Having stated the reason why lime is used, we will give the simplest and best practice in the art of combining potash with an animal or vegetable oil or fat, which chemical compound is soap—soft if potash is used, and hard if soda is used. Refuse barrels and hogsheads are often used to drip and leach ashes in, and should stand on boards or plank, so as not to waste the lye. This done, a

›w inches of clean broom-straw should be placed over all ıe bottom of the barrel and pressed down. For a hogs-ead of ashes, a good bushel of recently slaked lime ıould be spread evenly over all the straw; but a peck of me will do for a barrel of ashes. More lime will do no arm, and some ashes may require a little more. Now fill p the barrel of ashes, pound them down moderately, and our on boiling water, or that which is hot, until the lye uns out at the bottom. If the ashes were good, this lye vill make soap with very little boiling; but if the potash is oo diluted, some of the water must be evaporated before ne chemical union between the alkali and grease will take lace. If too little grease is put in the pot or kettle, more ıust be added; and if there is too much for all to combine vith the potash, the excess must be removed after the soap s cold. Where salt is cheap, it is largely used in the manu-acture of bar soap. Turpentine and rosin are also used in his branch of business. The explanations in reference to oda and turpentine soap will be given elsewhere. Salt is ow too expensive to be used in soap-making.

In an article on soap and potash from the Atlanta Com-ıonwealth, in the Southern Field and Fireside for October, 861, great stress is laid upon the ease with which we can ıanufacture potash in large quantity within the limits of he Southern Confederacy, and the consequent production f soap: "But whether we make our soap or establish ıanufactures, we need lye or potash in large quantities. 'o have this we must burn the light kind of wood, for ome wood is better than other sorts, and we must save all he ashes and take good care of them. The ashes should ıot only be saved for this purpose, but to be used as ma-ure. It is a shame that we have been so long and so villingly dependent on the North for so large a catalogue f the commonest articles, and even for the article of soap."

The following on the same subject is from the Richmond Dispatch, which I condense: "The great scarcity of soap t the present time arises from the want of potash and oda ash. Either will make soap. The latter is found in

its natural state (*natron*) in Egypt and South America, but the principal supply has been obtained from Great Britain, procured by the burning of sea-weeds. The former (potash) is supplied mostly from Canada and the State of New York. There is in the Confederate States any quantity of material to make potash, and I would call the attention of farmers to its production. It requires but a simple process in its manufacture—a few large iron pans and a half-dozen whiskey barrels, with heads out, and an iron ladle, being all the apparatus required.

"Most weeds furnish potash, in a greater or less degree, to every one hundred pounds. The following plants will furnish of potash:

Oak wood.	.2½ lbs.	Potato stem.. ...	..55 lbs.
Wheat straw	.4¼ "	Corn-stalks ..	...17 "
Barley straw	.5 "	Oak bark and elm leaves	.24 "

"These articles can be obtained by the farmers at little cost. Select a shaded position, gather in a large heap, set fire to it, keeping the fire up until several bushels of ashes are obtained; fill each barrel about one-quarter full of slaked lime; fill it then with water, stirring the ashes well; let it stand over night, or for about twelve hours, *stirring* frequently; strain off the lye as clear as possible; pour in the kettles, and evaporate over a wood fire. The kettle should be kept constantly full for two days (a little experience will soon teach the quantity of lye it will require to make them half full with potash). The evaporation should be continued until the mass obtains the consistency of brown sugar; then increase the fire, by which it will be fused; continue it until quiescent, and looks like melted iron; with a ladle transfer it to iron pans or baking-ovens, and allow it to cool; it may be then broken in pieces, and packed in tight boxes or barrels. The experiment will pay well any enterprising farmer. The article cannot now be obtained at any cost, and can be sold at a high rate. We hope this may induce some to try it. The expense of fixtures is small. Pine wood furnishes but little potash."

Ure, in his Dictionary of Science and Manufactures, art.

Potash, p. 457, says: In America, where timber is in many places an incumbrance upon the soil, it is felled, piled up in pyramids and burned, solely with a view to the manufacture of potashes. The ashes are put into wooden cisterns having a plug at the bottom of one of the sides under a false bottom; a moderate quantity of water is then poured on the mass, and some quick-lime is stirred in; after standing for a few hours, so as to take up the soluble matter, the clear liquor is drawn off, evaporated to dryness in iron pots, and finally fused at a red heat into compact masses, which are gray on the outside, and pink-colored within. All kinds of vegetables do not yield, he adds, the same proportions of potassa. The more succulent the plant, the more does it afford; for it is only in the juices that the vegetable salts reside, which are converted by incineration into alkaline matter. Herbaceous weeds are more productive of potash than the graminiferous species, or shrubs, and these than trees; and for a like reason twigs and leaves are more productive than timber. But plants in all cases are richest in alkaline salts when they have arrived at maturity. The soil in which they grow also influences the quantity of saline matter. The following table exhibits the average product in potassa of several plants, according to the researches of Vauquelin, Pertuis, Kirwan and DeSaussure:

In 1000 *parts*	*Potassa.*	*In* 1000 *parts*	*Potassa.*	*In* 1000 *parts*	*Potassa.*
Pine or fir	0.45	Thistles	5.00	Bastard chamomile—	
Poplar	0.75	Flag stems	5.00	*Anthemis cotula*, L	19.06
Trefoil	0.75	Small rushes	5.08	Sunflower stalks	20.00
Beechwood	1.45	Vine roots	5.50	Common nettle	25.03
Oak	1.53	Barley straw	5.80	Vetch plant	27.50
Boxwood	2.26	Dry beech bark	6.00	Thistles in full growth	35.37
Willow	2.85	Fern	6.26	Dry straw of wheat	
Elm and maple	3.90	Large rush	7.22	before earing	47.00
Wheat straw	3.90	Stalk of maize	17.15	Wormwood	73.00
Bark of oak twigs	4.20	Bean stalks	20.00	Fumitory	79.00

Stalks of tobacco, potatoes, chestnut-husks, broom-heath, furze, tansy, sorrel, vine leaves, beet leaves, orach, and many other plants abound in potash salts. In Burgundy the well known *cendres gravelées* are made by incinerating the lees of wine pressed into cakes and dried in the sun; the ashes

contain fully sixteen per cent. of potassa. To manufacture *carbonate of potassa*, chlorate, etc., from ashes, see also Ure's Dictionary. The corn-shuck and cob contain potash, and an economical soap is made from corn-shucks. See "*Zea*," in this volume.

Count Chaptal, "Chemistry applied to Agriculture," p. 290, refers to the method of using economy in washing and bleaching cloths, linen, etc., by a soapy liquor, a solution of oil and soda, in place of ordinary soap. He also introduces and describes a plan for washing and cleansing household linen and cotton yarn by steam from alkaline solutions. The expense is three-sevenths of the expense of the common method.

I introduce the following from Chaptal's Chemistry applied to Agriculture, as it shows the very different composition of different plants—the potato, for example:

"It appears that the three earths which form the basis of the most fertile soil enter into the composition of plants. Bergmann has proved this by an analysis of several kinds of grain, and Ruckert, by the results of his experiments upon a variety of vegetable productions, in a way to put it beyond doubt. About one hundred parts of ashes well leached, and consequently disengaged of all their salts, yielded

	Silica.	*Lime.*	*Alumina.*
Ashes of wheat.	.48	37	15
" oats,.	.68	26	6
" barley	.69	16	15
" rye.	.63	21	16
" potatoes...	.. 4	66	30
" red clover.	.37	33	30"

"Soft soaps," says Ure, "are usually made in this country with whale, seal, olive, and linseed oils, and a certain quantity of tallow; on the Continent, with the oils of hemp-seed, sesame (*bené*, which is planted in South Carolina), rapeseed, linseed, poppy-seed, and colza, or with mixtures of several of these oils. When tallow is added, as in Great Britain, the object is to produce white and somewhat solid grains of stearic soap in the transparent mass, called figging, because the soap then resembles the

granular texture of a 'fig.'" "The potash lyes should be made perfectly caustic, and of at least two different strengths," etc. See Ure, p. 668, for method. Any of the seeds of our oily plants, the cultivation of which I have so often recommended, can be pressed in a flannel bag in an ordinary cotton-press. If the pressure is exercised in a warm room heated by a stove, the escape of the oil will be much facilitated. A lye made of wood ashes will stop the rust in wheat, if the seeds are soaked in it before being planted for two or three hours. It is a useful substitute at this time for the brine which is usually made of sulphate of copper or salt.

As the Concentrated Lye may be made from ashes, I am induced to insert the following on this all-important subject. Resin is abundant in the Confederate States, and vegetable wax and oils can be obtained. See "*Myrica*" and *bené* ("*Sesamum*"). See method of preparing concentrated lye, "*Quercus alba*," in this volume.

Yellow, or rosin soap.—Dissolve one pound of concentrated lye in one half-gallon of water, and set it aside; heat in a kettle one gallon of water and three and a half pounds of fat or tallow, and commence to make the soap just as above for hard soap, with small quantities of lye, and a very small fire, until the soap is ready for salt, but add no salt. Put in now one and three-fourth pound of powdered rosin, and let it boil down by constantly stirring until the soap sticks on the kettle, and gets very thick. It is now finished, and may be put into a mould.

Hard fancy soap.—Dissolve one pound of the concentrated lye in two and a half pounds of hot water, and let it cool; then melt by a low heat five pounds of clear fat or tallow, pour in the lye in a very small stream, and stir it rapidly; keep stirring until all has assumed the appearance of thick honey, and falls off the stirrer in large drops. It is then finished. Cover it up, and set the batch in a warm place; or better, cover it with a woollen blanket to keep in the heat, and let it stand for twenty-four hours, when it will have set into a fine, hard soap, which may be per-

fumed and variegated with colors by stirring the desired colors or perfumes into the mixture just before covering. If lard or olive oil is used, no heating of the same is required.

Soft soap.—To one pound of the concentrated lye add three gallons of soft water, and four and one-half to five pounds of fat or tallow; boil until the mass gets transparent and all the fat has disappeared. Now add fifteen gallons of water, boil a few minutes, and the soap will be ready for use. As soon as cold, it will be a perfect jelly. If still too thick, add more water, which can be done to make the soap to any consistency desired. Twenty-five gallons of good soft soap can be made in this way out of one pound of the concentrated lye.

Pump water is softened and made fit for washing as follows: dissolve one cake of the concentrated lye in one gallon of water, and keep it for use in a well-corked demijohn or jug. To a tub full of pump or hard spring water add from one-eighth of a gill to a pint of the clear solution; the quantity of course varies according to the size of the tub, and the nature of the water, some taking more and some less. A tablespoonful will generally be found enough to make three to five gallons of water fit for washing. In all the above operations, it should be remembered to replenish the water which may evaporate while dissolving the concentrated lye, or while boiling.

Consult "*Salsola kali*" for soda and soda soaps from ashes; also "oak" (*Quercus alba*), for additional information.

To make twenty pounds of cheap soap from four pounds.—The Southern Field and Fireside directs: four pounds of turpentine soap, one half-pound of soda; add two gallons water, boil ten minutes, add a spoonful of salt, and boil ten minutes more.

Economy in the use of salt.—I insert the following for its utility in the present exigency: "Green wood contains some forty per cent. of its weight of moisture, which forms a watery vapor when burning; and even dry wood has over forty per cent. of the elements of water, oxygen, and

hydrogen that forms vapor when such wood is burnt. Coal consists mainly of the carbon in wood, which in burning forms a very drying heat. Most of our readers are familiar with the usual process of barbecuing large pieces of meat over coals. If such meat were too high above the coal fire to roast, it would soon dry. When dry, a very little salt and smoking will keep it indefinitely. Like cured bacon, it should be packed in tight casks, and kept in a dry room.

"After one kills his hogs, if he is short of salt, let him get the water out of the meat by drying it over burning coals as soon as possible, first rubbing it in a little salt. Shade trees around a meat-house are injurious by creating dampness. Dry meat with a coal fire after it is smoked. You may dislike to have meat so dry as is suggested, but your own observation will tell you that the dryest hams generally keep the best. Certainly, sweet, dry bacon is far better than moist, tainted bacon, and our aim is simply to show how meat may be cured and long kept with a trifle of salt, when war has rendered the latter scarce and expensive." As this is an important question in every point of view at present, I will also cite *on the manufacture of salt* an elaborate article in the P O. Reports, 1855, p. 143, by W C. Dennis, of Key West, Florida; also P O. Reports, 1857, p. 133. The mode of crystallizing, etc., is explained in a plain, practical manner, with wood-cuts of machinery. Evaporation through thorns, wood-shavings, etc., is described.

Carya olivæformis. Pecan. Mississippi nut. Cultivated in Atlantic states.

I have observed it growing wild in Ward's swamp, St. John's, Berkley, S. C., in company with the *C. myristicæformis* or nutmeg hickory of Mx. No doubt the fruit was disseminated from neighboring plantations, where it is cultivated. The fruit of the plants of this order are favorite articles for table use in the Confederate States. The pecan-nut is rich and nutritious, and the tree might be planted

as a source of profit, as it is a rapid bearer, attaining a large size.

Michaux advises that the shoots should, for the purposes of fruiting, be grafted on stalks of the common walnut tree. The tree abounds in upper Louisiana and Illinois. A swamp of 800 acres is said to exist on the right bank of the Ohio, opposite the Cumberland river. The wood is coarse grained, heavy, and compact. Michaux.

SAURURACEÆ.

Saururus Cernuus, L. Grows in inundated soils; Richland; vicinity of Charleston; Newbern; and collected in St. John's, where the root is used, in the form of a poultice, in discussing tumors, and as an application in abscess of the breasts occurring after labor. It is thought by many to possess great value in this respect. In a note to Ell. Bot., 505, it is also said that the fresh root is applied with advantage as an emollient and discutient to inflamed surfaces.

SALICACEÆ. (*The Willow Tribe.*)

Bark generally astringent, tonic, and stomachic.

Salix nigra, L. Willow. Grows along streams; Richland, Gibbes; vicinity of Charleston; collected in St. John's; Newbern. Fl. May.

Bell's Pract. Dict. 403; U. S. Disp. 622. See work of younger Michaux, Ball. and Gar. Mat. Med. 337; Mér. and de L. Dict. de M. Méd. vi. 185; Griffith, Med. Bot. 583; Schœpf, Mat. Med. 43; Ell. Bot. Med. Notes, ii. 671. The willow is supposed to furnish us with one of the best substitutes for Peruvian bark; the *S. alba*, which may be included among the many varieties found in the Confederate States, and which are not yet accurately distinguished, seems to be held in high estimation. But this species also, is considered valuable; the bark possessing some power as a purgative, anti-intermittent, and vermifuge. It also furnishes the principle called *salicin*, which, from the

results of late experiments, is found to be much less valuable than *quinia*, but is a good bitter tonic. See Journal Phil. Coll. Pharm. for the mode of preparation. Bark of the root and branches is officinal. It is tonic and somewhat astringent. Decoction made with one ounce of bark to one pint of boiling water; dose 2 fluidounces. It should be boiled ten minutes, and strained while hot. Dose of *salicin* from 2 to 8 grains and increased. It might well attract attention as a substitute for quinine. The large stems of this tree are light and durable, and are used for the timbers of boats.

There are several other species in the Confederate States. The willow—osier willow (see article in Farmer and Planter, Sept., 1861), is cultivated extensively in Germany, France, and Belgium for making baskets, hats, screens, etc., etc. After most careful experiment it has been found that the best species to introduce into the Confederate States for the purpose, are the *Salix forbeyana*, *Salix purpurea*, purple willow, and *Salix triandra*, long-leaved willow. *Forbes' willow* is very productive and hardy, one of the most valuable species for common work, where unpeeled rods are used. It does not whiten well.

Purple willow.—Experiments have shows that this species is the most valuable and profitable for osiers in this country. With good ordinary culture its shoots will average ten feet in length; will thrive best in deep, moist soil, where it will easily yield from four to five tons per acre of the most excellent rods, well qualified for the finest work. The purple willow, aside from being the most valuable for manufacturing all the finest kinds of willow-ware, is the best species for hedges, and is most extensively used for that purpose in Germany and Holland. The leaves and the bark being so very bitter will not be touched by cattle, while the shoots may be formed into any shape, and the hedge thereby made impregnable. Fine hedges or screens of twenty-five feet in height may be grown from willow cuttings of this species in five years, thus affording almost immediate shelter, so indispensable at all seasons of the

year. We have seen, the writer adds, screens in Russia, of the willow, forty feet high, surrounding parks from three to four hundred acres in extent, affording the most perfect shelter against the sweeping winds and storms. Its soft, green, and glossy foliage will make it an object of great beauty and attraction.

The last mentioned, the *Salix triandra*, long-leaved willow, will grow with almost equal vigor in any soil of depth; ripens its shoots very early, and whitens beautifully; is tough and pliable, and a general favorite with our German basket-makers for split-work. This willow is most extensively cultivated in Germany by the thousands of acres. Its cultivation is highly esteemed by the people, and much encouraged by the government.

Salix caprea, though not valued as an osier, is deserving of attention, as it will grow in wet situations where other trees will hardly exist. It furnishes food for bees at a time when it is most needed. In early spring, before other flowers appear, this tree is a mass of dazzling bloom, most eagerly sought after by bees. This willow is also valuable for hoops.

The cuttings, in our climate, should be prepared in fall or early winter, and if planted at that time the ends will form the callosity preparatory to sending out roots. In setting the cuttings in the ground prepared for them, care should be taken to have them set deep enough; a small portion only should remain above ground; the strongest roots always start from the lower end of the cutting or set; by doing so the most vigorous growth will be obtained.

In establishing a willow plantation, cuttings of vigorous upland growth, that have had an abundance of room, should only be purchased and used, and, if obtainable, select wood of one year's growth, with a portion of two years wood from the lower extremity. Deep soils, free from standing water, but yet so soft that ploughing is impracticable, will grow enormous growths of *S. triandra*, requiring no further cultivation but keeping the weeds down for the first year or two, after which time the willows

·ill be of sufficient strength to take care of themselves, and rovide for their own shade and well-being. We have in ıe Confederate States large districts of deep alluvium, ften inclining to swamps, which are so much drained as to o away with their swampy character, and with no other reparation than removing the trees, may make excellent villow plantations. Sir J. W Hooker observes: "The ıany important uses rendered to men by the different pecies of willow serve to rank them among the first in the st of our economical plants." The editor of the Southern Farmer and Planter then quotes a statement by W P Rupert, of Geneva, N. Y., showing a net profit of $533 per cre from planting the osier willow.

See, also, Chaptal's Chemistry applied to Agriculture for method of planting willow along borders of land liable to nundation, to lessen the force of the water, to strengthen he soil, and reclaim the land. A border of willow and oplar is planted over the banks or along the sides of the vatercourses, and the plants are cropped at the tops so as o increase the thickness of their growth.

In a paper in Patent Office Reports on Agriculture, p. 46, 1851, by W G. Haynes, of Putnam county, N Y., it is tated that four or five million dollars worth of willow vere imported annually into the United States from France and Germany. The prices ranged from $1 to $1 30 per ton veight. The writer confines his attention to the "three kinds best adapted for basket-making, farming, tanning, and fencing." He says: "The *Salix viminalis* is that specimen of all others best adapted for basket-makers. An acre of this properly planted, and cultivated upon suitable soil, vill yield at least two tons weight per year." See paper for yield. The people of England, till 1808, relied entirely for their supply upon Continental Europe. The *Salix alba*, or Bedford willow, is much planted by the Duke of Bedford. "The bark is held in high estimation for tanning, the wood for shoemakers' lasts, boot-trees, cutting-boards, gun and pistol stocks, and house timber; the wood being fine grained, and susceptible of as fine a polish as rose-

wood or mahogany. An acre of this kind of wood, ten years old, has sold in England for £155." The "*Salix alba* is extensively used by retired tradesmen who build in the country for the purpose of securing shade in a short time, and by the nobility around their fish-ponds and mill-dams, and along their watercourses and avenues. This is the principal wood used in the manufacture of gunpowder in England." See, also, article "*Hemp*." It requires twelve thousand cuttings to plant one acre. Much land worth for little else might be planted in willow.

The next species is the *S. caprea*, Huntingdon willow, "which is a good basket willow, and is used extensively in England by the farmers for hoop-poles and fencing. Their manner of planting when for fencing is by placing the ends of the cuttings in the ground, and then working them into a kind of trellis-work, and passing a willow withe around the tops or ends, so as to keep in shape for the first two years. They cut the tops off yearly, and sell them to the basket-makers, thus having a fence and crop from the same ground." Another description of fence is also made from the *Salix caprea*, "known in England by the name of hurdle fences, which may be removed at the pleasure or discretion of the proprietor." See article "Charcoal," in Wilson's Rural Cyc. The dogwood and alder are also used for making gunpowder. See, also, Ure's Dictionary of Arts. In most of the large manufactories the charcoal is distilled from iron vessels, by which means it is obtained in a state of considerable purity, and the other products are saved. See "*Pinus.*"

A variety of the *S. viminalis*, called the velvet osier, is the very best for basket-making. In England, Wilson says, an acre of osier will yield greater profit than one of wheat. The *Salix purpurea*, as was stated, is also valuable. "The cutting of a basket twig should be made slopingly within three buds of the point whence the shoot issued; and the cutting of a hoop willow may be made so low as to leave only the swell at the bottom of the shoot. Basket twigs are commonly sorted into three sizes, and tied into

undles of each two feet in circumference: and when they re to be peeled, they are set on their thick end, a few ıches deep in standing water, and left there till comıonly the latter part of the following May. The apparatus or peeling is simply two round rods of iron, nearly half an ıch thick, sixteen inches long, and tapering a little upvard, welded together a little at one end, which is sharpned, so that it may be easily thrust down into the ground. Vhen thus placed in a piece of firm ground, the peeler sits own opposite to it, and takes the willow in the right hand y the small end, and puts a foot or more of the great end ıto the instrument, the prongs of which he presses toether with the left hand, and with the right draws the villow toward him, by which operation the bark will at nce be separated from the wood; the small end is then :eated in the same manner, and the peeling is completed. ıfter being peeled they will keep in a good condition for a ›ng time, till a proper market be found. Rural Cyc.

Charcoal made of willow or oak is a useful antiseptic gent, possessing the power of absorbing gases, and useful ı dyspepsia and ill-conditioned states of the gastro-intes-.nal mucous membranes. It is also used as a mechanical ıxative, in doses of ten to fifteen grains. It is supposed ɔ act as a prophylactic in yellow fever. In preparing it, ıe common charcoal from green wood is reduced to power. This is reheated and burned to ignition in a tightly overed vessel. It is then kept for use in closely stopped ottles, as it will absorb moisture and gases from the tmosphere. It is used also as a general purifyer. Brackɪh water strained through a layer of sand and powdered harcoal is made sweet and pure.

For making *gunpowder charcoal*, the lighter woods, such s the willow, dogwood, and alder answer best; and in their arbonization care should be taken to let the vapors freely scape, especially toward the end of the operation, for vhen they are reabsorbed, they greatly impair the comustibility of the charcoal. The charcoal of some wood ontains silica, and is therefore useful for polishing metals.

Dr. Mushet published the following table of the quantity of charcoal yielded by different woods:

Chestnut	.23.2 of charcoal—glossy black, compact, firm.
Oak	.22.6 black, close, very firm.
Walnut	.20.6 dull black, close, firm.
Holly	.19.9 dull black, loose, and bulky.
Beech	.19.9 dull black, spongy, firm.
Sycamore. ..	.19.7 fine black, bulky, moderately firm.
Elm	.19.5 fine black, moderately firm.
Norway pine.	.19.2 shining black, bulky, very soft.
Sallow or willow	.18.4 velvet black, bulky, loose, soft.
Ash	.17.9 shining black, spongy, firm.
Birch	.17.4 velvet black, bulky, firm. [*Am. Farmer's Enc.*

On the subject of *Nitre*, and the materials for gunpowder, I will introduce the following from Chaptal's Chemistry applied to Agriculture, p. 153, and may reproduce portions or all of Prof. Leconte's paper on nitre beds. Different kinds of wood, he says, yield coal of very different quality; the best coal is heavy and sonorous, and is produced from wood of very compact fibre. The heat it affords is quick and strong, and its combustion, though vigorous, lasts a long time. The charcoal of the green oak of the South burns at least twice as long as that of the white oak of the North, and the effects produced by the heat it affords are great in the same proportion.

The light, porous, white woods afford a brittle, spongy coal, of less weight, and which may be easily reduced to powder; this coal consumes quickly in our fireplaces, but is useful for some purposes, particularly in the manufacture of gunpowder, for which use it is prepared by the following process: a ditch of five or six feet square and of about four in depth is dug in a dry soil; the ditch is heated by means of a fire made of split wood; the shoots and leaves are stripped from the young branches of elders, poplars, hazels, and willows, of which the coal is to be made, and as soon as the ditch is sufficiently heated the branches are thrown gradually in; when carbonization is at its height the pit is covered over with wet woollen cloths. This charcoal is more light and inflammable than that of

he denser woods, and is susceptible of being more easily .nd completely pulverized. M. Proust, who has made ıumerous experiments to ascertain the kinds of plants vhich furnish the best coal for powder, found that pro- :ured from the stalk of hemp to be preferable to any other.

The most perfect process of carbonization is by means of , close apparatus: for this purpose a stone or brick building s constructed, of eighteen to twenty-five feet square; this s matted over, and the inside of it lined with a brick wall; hrough the extent of it cast-iron cylinders are laid in such , manner that one of the two ends shall have an external ommunication, while the other carries the smoke into ıne of the chimneys. As soon as the building is filled vith the wood for carbonization the cylinders may be ıeated. The vapor which is distilled from the wood is eceived into sheet-iron pipes, placed in the top, which onvey it into tubs where it is condensed. Count Chaptal steems this to be the best and most economical apparatus or making charcoal; besides, it allows the preservation of he pyroligneous acid, which brings a good price, and may .lso be purified and converted into vinegar.

In England charcoal is prepared in two different ways. n one, billets of wood are formed into a heap, which is overed with turf, and a few small openings only left for he admission of the air requisite to maintain it in a state ıf low combustion after it is lighted. When the whole ıeap is on fire, the holes are stopped, and after the mass ıas cooled the residue is charcoal. This is substantially he method adopted on our plantations. In the other node, the wood is distilled in iron cylinders, in which case he products are pyroligneous acids, and empyreumatic oil; .nd what remains in the retort is charcoal. The quantity ıf the distilled products, as well as of the charcoal, de- ıends on the kind of wood employed. One hundred parts ıf dried oak yields of pyroligneous acid, 43. parts; carbon- .te of potassa, 4.5 parts; empyreumatic oil, 9.06 parts; harcoal, 26.2 parts. Farmer's Encyc. See also "*Quercus*" .nd "*Pinus*," in this volume.

The following advertisement appeared in the papers during the year 1862:

To Contractors.— Willow wood wanted.—Five hundred cords willow will be contracted for, to be delivered on the line of the canal, at the government powder factory, at Augusta, Ga., at the rate of not less than one hundred and fifty cords per month, commencing the 1st of December next. The willow may be of any size, the smaller branches being preferred; the larger sticks must be split into parts not larger than the arm. It must be cut into uniform lengths of three feet, and each cord will measure fourteen feet long, three feet high, and three feet broad, containing one hundred and twenty-six cubic feet. The bark must be carefully peeled off at the time of cutting.

Purification of water by charcoal.—The reader is referred to Chaptal's "Chemistry applied to Agriculture" for much that is practical in the domestic economy of our plantations in the South on the manufacture of wine, brandy, etc. In his chapter on the "means of preparing wholesome drinks for the use of country people" he gives the following method for rendering impure water pure. It would be found of great service at the present time, and our generals in the field might thus, at little cost, purify water for the use of their camps, for want of which simple expedient moves, possibly disastrous, have often to be made in face of an enemy. "The water made use of is often muddy, or has a bad smell, either of which faults may be corrected by filtering it through charcoal; the process may be performed in the following manner: place a large cask upright, in the coolest situation you can command, knock out the head, and form in the bottom of it a bed of clean sand upon which place one of charcoal, and above these fasten securely a double head pierced with holes. When this is done the cask may be immediately filled with the water which is to be purified. The filtrated fluid may be drawn off by means of a stop cock placed at the bottom of the bed of sand; it will be found to have become clear and inodorous in its passage through the sand

and charcoal. The preservation of this apparatus requires but little care; when the charcoal ceases to produce the desired effect it must be either well washed or replaced by a new portion." This plan can be put in practice by any one, and at any time.

Salix Babilonica. Weeping willow. Completely naturalized in South Carolina.

It forms one of our most beautiful and graceful ornamental trees. Only the pistillate plant is found here; and hence it does not mature its fruit as the others do.

Populus alba. White poplar. Introduced.

This is an aquatic plant, yet will grow on dry soils. It is easily propagated by suckers, grows rapidly, is very tenacious of life, and is one of the trees planted to prevent the encroachment of the sea or rivers, by being planted with willows on the margin. See *Salix*.

The poplar has a very white, light wood, very suitable for flooring; also eminently suited, on account of its lightness, for the manufacture of trays, bowls, etc. "It is excellently adapted for the purposes of the bellows-maker, and of the manufacturer of wooden soles of shoes; as good for light carts; as excellent for laths and packing-cases; as very superior for wooden constructions under water; and in fact as available for an almost innumerable variety of purposes, from the mean ones of fuel and poles to the noble ones of tools and furniture. Pontey even asserts it to be perfectly suitable for almost every article usually made of mahogany, and quite capable of being stained and doctored into a very close imitation of that valuable wood." Wilson. The wood of our wild, tulip-bearing poplar (*Liriodendron*) is adapted to similar purposes, being light, and easily worked, and used by the cabinet-maker for many purposes. It is stated in the Farmer's Encyclopædia that by splitting the wood of the white poplar into thin shavings like tape or braid, the stuff called *sparterie*, used for hats, is manufactured. These shavings

are always made from green wood. One workman can, with the aid of a child to carry off the shavings, keep several plaiters employed. This might be made a source of successful industry in the Confederate States.

Upon examining the excrescences caused by an insect in large numbers on the leaves of the cotton-wood tree (*P. heterophylla*, L.), I find them possessed of great bitterness, and suggest an examination into their tonic properties.

Balsamaceæ.

Liquidambar styraciflua, L. Sweet-gum. Diffused. Fl. March.

U. S. Disp. 273; Pe. Mat. Med. and Therap. ii, 184; Ed. and Vav. Mat. Med. 303; Journal Phil. Coll. Pharm. vi, 190; Royle, Mat. Med. 562; Bergii, Mat. Med. ii, 798; Linn. Veg. M. Med. In former times the resin was used in scabies; and it is said (Am. Herbal, by J. Stearns) to be useful in resolving hard tumors in the uterus. The Indians esteemed it an excellent febrifuge, and employed it in healing wounds. Mér. and de L. Dict. de M. Méd. iv, 128, and the Supplem. 1846; Ann. de Montpellier, 1805, 327; Journal de Pharm. vii, 339, and vii, 568; Bull. de Thérap., Oct. 1833, where D. L'Héritier proposes to treat blennorrhagias and leucorrhœas with liquid styrax. A kind of oil, called *copalm*, is extracted from it in Mexico, which, when solidified, is called copalm resin; this is an excitant of the mucous system, and it is given in chronic catarrhs, and in affections of the lungs, intestines, and urinary passages. This is cordial and stomachic; it excites both perspiration and urine; it is also used in perfumery. In South Carolina and Georgia the temperature is not high enough for this tree to furnish much gum. Dr. Griffith experimented with it in the latitude of Baltimore, and obtained a small quantity by boiling the twigs and branches; he found that it exists in greatest abundance in the young trees just before the appearance of the leaves. It is about the consistence of honey, of a yellow color, and of a pleasant, balsamic odor and taste. The tree is of rapid growth.

and is ornamental—frequently assuming the appearance of a sugar-loaf. The wood is soft, but not durable. A decoction of the inner bark of the gum in a quart of milk, or a tea made with boiling water is one of the most valuable and useful mucilaginous astringents that we possess (Dr. Richard Moore). It can be employed with advantage in cases of diarrhœa and dysentery. I have discovered that the leaves also of the gum, as well as those of the myrtle, are exceedingly rich in tannin, and would advise them to be used while green as a substitute for oak bark. They can always be obtained in the greatest abundance. As the result of my comparative experiments, these, with the leaves of the sumach, possessed more tannin than any other leaf. See "*Tannin.*" The chinquapin, given with milk, is a useful astringent; see, also, blackberry (*Rubus*) and dogwood (*Cornus*). The gum of the sweet-gum, mixed with suet, is used by the vegetable practitioners in the treatment of itch.

Leaves of native trees for Tanning Leather recommended in place of Oak bark.—Compelled by sickness to make a temporary sojourn in St. John's, Berkley, S. C., during the months of October and November, 1861, I had the leisure to make some experiments upon the relative amount of the astringent principles in the *leaves* of several of our most abundant native trees. The reputed power of the dogfennel and other plants for the rapid tanning of leather attracted my attention to the subject. I publish the following, that the green leaves may be collected and used before they fall. They can be much more readily obtained than oak bark. I made two series of experiments, with a solution of each leaf in boiling water, in separate test-glasses. After they had remained a sufficient time for the coloring matters and the astringent principles to be extracted, I subjected each to the appropriate reagents. Solutions of iron as well as gelatine were employed, which responded perfectly, and gave delicate shades of difference. The leaf, well chewed and tasted, also gives a very good idea of its astringency, and consequently affords an approximation to the *tannin*

and *gallic acid* it contains. It will be seen that the *leaves* of the sumach, sweet-gum, myrtle, blackberry, *Clethra tomentosa* and *Andromeda nitida* (both abundant in our damp pine barrens, along the margin of ponds), and the *fruit* of the unripe persimmon, contain the largest amounts of tannin, and perhaps gallic acid.

I took special care to select trees, for the most part, which grew plentifully, and I particularly recommend those just mentioned to be used in lieu of oak bark for tanning leather, on account of their abundance and the ease with which the fresh leaves can be gathered, and because of the scarcity of the oak, and the injury to these valuable timber trees. If the oak is deprived of its bark the wood should always be converted into ashes.

Strange to say, the dogfennel (*Eupatorium fœniculaceum?*) occupied a very inferior position as a tanniniferous plant.

FIRST SERIES.

(*Relative amount of Astringency expressed by numerals.*)

1. *Clethra alnifolia*, L. (*C. tomentosa*, Lam.) Diffused in damp pine lands.

1. *Andromeda nitida.*

1. Fruit of unripe Persimmon (*Diospyros Virginiana*); color of solution, bluish black.

2. Sweet-Gum (*Liquidambar styraciflua*).

2½. Swamp Myrtle (*Myrica cerifera*).

3. Sweet Swamp Bay, or Laurel (*Magnolia glauca*). All the above rich in tannin.

4. Oak Leaves, Black Jack (*Quercus nigra*, L.)

5. Leaves of Persimmon.

6. Sassafras (*Laurus Sassafras*), a trace.

7. *Prinos Glaber* (ink-berry). Tannin not very evident.

SECOND SERIES.

1. Sumach (*Rhus copallina* L. and *R. Glabra*.

2. Blackberry (*Rubus villosus* and *trivialis*), both very rich in tannin.

3. Sweet leaf (*Hopea tinctoria*), tannin slightly present.

4. Dogfennel (*Eupatorium fœniculaceum*), a trace.
5. Sassafras, a trace.
6. Gall of the earth (*Prenanthes alba*), very bitter; tannin, none.

Both the leaves and the excrescences on the leaves of the smooth Sumach (*Rhus glabra*), growing along streams in the upper districts, are very rich in tannin, and should be used.

The Alder (*Alnus serrulata*), abundant along watercourses, is also astringent. The reader can find a list of the plants and trees yielding tannin in Ure's "Dictionary of Arts, Manufacture, and Mines." See also Oak ("*Quercus*") and Sumach ("*Rhus*"), in this volume.

CALLITRICHACEÆ.

Callitriche verna, W } Water chickweed. Grows
" *heterophylla*, Ell. Sk. } in shallow water. Collected in St. John's; vicinity of Charleston. Fl. May

Shec. Flora Carol. 326. It is considered by the planters a valuable diuretic remedy in dropsy The tincture of the whole plant in spirits is employed. A decoction is given to horses when diuresis is desired.

SANTALALES.

Nyssa aquatica, L. Black-gum; tupelo; sour-gum. The roots are immersed in inundated soils; collected in St. John's; observed in Fairfield district; vicinity of Charleston; Newbern.

The roots are white, spongy, and light, and are sometimes used in the Confederate States as a substitute for cork.

The genus exhibits a constant peculiarity of organization ("the fibres are united in bundles and interwoven like a braided cord"), hence the wood is extremely difficult to split, unless cut into billets—much used for hubs of wheels; also preferred for the *sideboards* of carts. *Am. Sylva.* Trays, bowls, dippers, mortars, and other utensils are manufactured from it. I had recommended it as a suitable material for

shoes in my article in DeBow's Review, August, 1861, and have since had a number made from the wood of the roots for negroes residing on plantations in South Carolina. A friend from St. Paul's parish recommends that only the sole of the shoe be made of wood, an inch in thickness, cowskin, with the hair turned inside, being nailed on this over a last. To make the back of the shoe of wood also, gives pain to the wearer. The wood should be well seasoned, or it will crack; boiling will prevent this if the fresh wood is used. Very neat and well fashioned shoes, I am told, have been manufactured by gentlemen in Abbeville and other districts of South Carolina out of this wood. In the Charleston Courier, October, 1861, it is advised that when the black-gum is used as a substitute for leather, "for complete protection against moisture, a slip or inner sole and lining of any water-proof material may be added."

I introduce the following from the "Farmer and Planter," as not inappropriate. Every one who has visited Europe has seen the *sabot* worn by the peasantry:

A good thing for our negroes.—It cannot be denied that a number of diseases must result from the wearing of leather shoes by our negroes, when engaged in out-door operations during cold weather, or in wet situations. In Germany, Belgium, and France, in order to prevent those evils, at least to some extent, the use of wooden shoes has long since been introduced, and they are extensively worn by the whole farming and laboring population.

The governments of Europe have very much encouraged the manufacture of the same, and their preference over leather shoes is much recommended by all boards of agriculture and of health. There is hardly an operation on the farm and about the farm-houses, the garden, etc., in which they could not be most profitably used. They are perfectly secure against the penetration of water, and being always dry, will keep the feet warm, and thereby prevent many diseases. They are light and easy to wear, of a pleasant appearance, may be blackened or varnished. They can be worn with or without stockings; and, with

iany other advantages, they combine such durability as) last almost a lifetime, at a cost of from twenty-five to nirty-seven cents.

They are certainly entitled to the attention of the farm-ıg and laboring population of the South. The wood for heir manufacture is to be had in great abundance in most f our Southern states.

The following, addressed to the editors of the Charleston Jourier, is on the same subject:

Shoes without leather.—I saw the last autumn, at the store f Messrs. Howes, Hyatt & Co., shoe and leather dealers, ı the City of New York, a plantation brogan, differing from he old shoe, in having soles of some light, tough wood—he root of the swamp poplar, I think. The proprietors old me that they had patented the invention a year or two revious, and would warrant the brogan to outlast the best f the leather-soled. They said that they had large orders rom planters on the Mississippi, who had tried them, and ound that they were warmer, more durable, and more im-ervious to water than the leather-soled. The soles were nade by machinery. The upper leather was first securely acked to the inner sole, and the under sole securely fasten-d to the upper by about one dozen iron screws, securing he upper leather between the two soles.

With soles of wood and uppers of canvas we can be in-lependent of leather in the present scarcity of that article n our Confederacy.

Mr. W Gilmore Simms suggests to me the use of the upelo, on account of its lightness, for making cartridge-oxes.

Birds are fond of the fruit of this genus.

THYMELACEÆ. (*The Mezereum Tribe.*)

According to Lindley, the great feature of this tribe is he causticity of the bark, which acts upon the skin as a esicatory, and causes excessive pain in the mouth when hewed.

Dirca palustris, L. Canada leatherwood. Diffused; grows near Augusta at Colleton's Neck (Ell.); Bartram found it near Savannah. Fl. Feb.

Mér. and de L. Dict. de M. Méd. ii, 659; U. S. Disp. 1253; Coxe's Am. Disp. 259; Shec. Flora Carol. 513; Big. Am. Med. Bot. ii, 157; Barton's Collec. 32; Griffith, Med. Bot. 563; Raf. Med. Fl. i, 158. The berries are said to be narcotic and poisonous, and the bark has a nauseous odor and acrid taste, yielding its virtues to alcohol; eight grains of the powdered bark will produce violent vomiting, followed by purging. When applied to the skin, it blisters like mezereon. The juice has been applied to the nerve of a painful tooth with relief, and in diseases where acrid masticatories are serviceable. Bigelow says the decoction is sudorific and expectorant, and he considers it a good substitute for senega. The bark is also uncommonly tough, and was used by the Indians for cordage; the wood is very hard and pliant.

Its twigs are remarkable for toughness, are as strong and pliable as those of the lime tree, and are employed in America for the manufacture of various small articles. Its bark, also, has a homogeneous character with the twigs, and is used for making ropes and baskets; and both, but especially the twigs, occasion the plant to be popularly called in Canada leatherwood. This plant is an excessive favorite with snails! Wilson's Rural Cyc.

LAURACEÆ. (*The Cinnamon Tribe.*)

The qualities of the species of this order are uniform, being universally aromatic, warm, and stomachic.

Sassafras officinale, Nees.
Laurus sassafras of Ell. Sk. } Sassafras. Diffused in upper and lower country; Va. Fl. March.

Bell's Pract. Dict. 411; Eberle, Mat. Med. ii, 320; Drayton's View, 68; Ed. and Vav. Mat. Méd. 341; U. S. Disp. 640; Royle, Mat. Med. 518; Pe. Mat. Med. and Therap. ii, 253; Cullen's Mat. Med. ii, 200 and 579; Big. Am. Med.

Bot. ii, 142; Murray's Apparat. iv, 835; Kalm's Travels, 1; Hoffman's Obs. Phys. Chem. 31; Clayton's Phil. Trans. iii, 332; Bremaine, "Sassafralogia," in 1627; Woodv. Med. Bot.; Griffith's Med. Bot. 552; Thornton's Fam. Herb. The plant contains an essential oil, obtained by distillation, which is heating, sudorific, and diuretic, and which is used o disguise the taste of medicines. In the Supplem. to Dict. de M. Méd. 426, 1846, it is reported that the essential oil, when placed in a temperature of 40° Fahr., will form rystals, which, being exposed to heat, return to pure oil: rom the Report in the Lond. Med. Journal vii, 2501, 831; Researches on the Ess. Oil of Sassafras, in the Comptes Rendus Hebd. des Sc. de l'Acad. des Sc. xviii, 705. After he conquest made by the Spaniards in Florida sassafras was sed in the treatment of syphilis, the warm infusion being pplicable in cutaneous disease, by acting on the emunctoies. The root is employed in this state, in combination with guaiac, sarsaparilla, and China briar (*Smilax*), in the ormation of diet drinks. It is diaphoretic and diuretic, seful in rheumatism, and Alibert speaks highly of it in out. The pith of the young branches, according to Eberle, ontains a great deal of mucilage; which is "an exceedingly ood application in acute ophthalmia, and no less useful in atarrhal and dysenteric affections;" it is not affected by lcohol; Griffith (Med. Bot. 552) also speaks favorably of it s an application to inflamed eyes, being effectual in the removal of the irritation so constant in this complaint. It is dvantageously given as a demulcent drink in disorders of he respiratory organs, bowels, and bladder; being more fficacious than that prepared from the leaves of *Bené* (*Sesamum Indicum*). It might be used as a substitute for acacia. The oil extracted from this plant is one of the heaviest of he volatile oils. Dr. B. S. Barton states that it has been ound an efficacious application to wens. Coll. i, 19. G. Velsch, "Lignum sassafras et radice diversum," Miscel. Cur. Nat. 332, 1670; C. J. Trew, Brevis Hist. Nat.; Arboris assafras dictæ (Nova acta Acad. Nat. Cur. ii, 271); G. D. hret de Arboribus Sassafras dictis et Londini cultis (Nova

acta ii, 236); Obs. on the Sassafras, in Obs. sur la Physique, xxiv, 63; Bonastre, Mém. sur l'Huile volatile de Sass. (Journal de Pharm. xiv. 645.) And, also, A. Buchner upon the Crystallization of the Oil of Sassafras.

The roots yield a drab color with copperas; no doubt a much lighter shade may be obtained by alum or vinegar as a mordant. I believe that any of our plants containing either tanning or colored juices may be used as dyes. Iron increases the shade by forming tannate or gallate of iron. See "*Rhus*", etc.

The leaves of sassafras contain an unusual proportion of mucilage, which would readily serve as a substitute for gum arabic, flax, slippery elm, *Bené*, etc. Two or three leaves, dissolved in water, yield a mucilaginous drink. I made great use of the tea prepared with sassafras root, gathered extemporaneously, while Surgeon to the Holcombe Legion, S. C. Vols. It was given whenever a warm, aromatic, mucilaginous tea was required, in fever, pneumonia, bronchitis, catarrhs, mumps, etc. The nurse detailed for each company procured the materials upon the spot where the company or regiment was posted. It served every purpose of the articles usually supplied by the medical purveyors of the army. The pith of the sassafras is also medicinal.

The spice bush (*Benzoin odoriferum*, Nees. *Laurus b.*, L.) was much used by the soldiers from the upper part of the state for making a pleasant aromatic tea. Many brought the plant with them. It is tolerably well diffused over the Confederate states, on banks of streams and low woods. In camp sassafras tea was often drunk daily by many of the officers and soldiers as a favorite substitute for green tea. It is thought to purify the blood, but the impression that it tends to impair the health and intellect if persisted in must be erroneous. The oil it contains is diuretic.

I have since read the following in the Farmer's Encyclopædia:

"The wood stripped of its bark is very durable, strong, and resists worms, etc. It forms excellent posts for gates.

edsteads made of it are never infested with bugs. It is,)wever, only occasionally employed for any useful pur-)se, and never found in the lumber-yards of large towns. he pith and dried leaves of the young branches of the ssafras contain much mucilage, resembling that of the cra plant, and are extensively used in New Orleans to icken pottage, and make the celebrated *gumbo soup.* In irginia, and other Southern states, the inhabitants make a ›er by boiling the young shoots of the sassafras in water, which a certain quantity of molasses or sugar is added, e whole being left to ferment. The beer is regarded as wholesome and pleasant drink during summer. So is an fusion of the bark of the roots, which is much drunk for e cure of cutaneous and other disorders."

A cheap and wholesome beer for the use of soldiers, or a table beer, is prepared from the sassafras, the ingre- ents being easily obtained. Take eight bottles of water, 1e quart of molasses, one pint of yeast, one tablespoonful ' ginger, one and a half tablespoonful of cream of tartar, ese ingredients being well stirred and mixed in an open ›ssel; after standing twenty-four hours the beer may be ›ttled, and used immediately. The reader interested in e manufacture of beer, ale, porter, etc., will find the ethods detailed in Solly's Rural Chemistry, Ure's Dic-)nary of Arts and Manufactures, and in Wilson's Rural yclopædia.

I add the method of preparing

The French Army Beer.—The following is the recipe of e beer that has been introduced into the French army)on the recommendation of the Medical Board. It is de- ribed as a very wholesome beverage, of pleasant and freshing taste, and promoting digestion in a remarkable gree. It may prove an agreeable beverage both in and tside of the army:

ater.. ..	.. .100 litres ..	.about 100 quarts.
)lasses....	.500 grammes. ..	...about 1 pound.
)ps.... ..	.. .. .. .100 grammes.	.about 3 ounces.
irshmallow root ..	50 grammes. ..	.about 1½ ounce.
ast.	.. .. 50 grammes. ..	.about 1½ ounce.

Make an infusion of the hops and marshmallow root with about twenty times their weight of the boiling water. Another part of the water is used to dilute the molasses, and another to dilute the yeast. All the fluids are then mixed, and put into a vessel for fermentation. After five or six days it will be ready for use

The following modification of the recipe may sometimes be preferable:

Water.	100 litres	.100 quarts.
Honey	..800 grammes	...1 lb. 10 oz.
Brown sugar ..	..800 grammes	.........1 lb. 10 oz.
Hops.	300 grammes.	.... 9 oz.
Yeast.	50 grammes. ..	....$1\frac{1}{4}$ oz.

I have no doubt the mucilaginous leaves of the sassafras or the *Bené* would serve as a substitute for marshmallow. See also "Persimmon" (*Diospyros*), "Apple," and "Hop," in this volume, for manufacture of domestic liquors.

Benzoin odoriferum, Nees V Ess. } Spice bush; fever
Laurus benzoin, L., Ell. Sk. } bush. Grows along rivulets.

Collected in St. John's, Charleston district; Richland, Prof. Gibbes; Newbern. Fl. April.

Mér. and de L. Dict. de M. Méd. iv, 51; U. S. Disp. 1233; Lind. Nat. Syst. Bot. 201; Griffith's Med. Bot. 553; Barton, 295. This is another of our highly aromatic, indigenous shrubs; the bark is, besides, stimulant and tonic; "extensively used, in North America, in intermittent fevers."

This tree contains a remarkable amount of aromatic property in every portion of it: it yields benzoin. Benzoin is also found in our grasses, *Anthoxanthum odoratum* (sweet-scented vernal grass), *Holcus odoratus* and *Mellilotus officinalis*—the principle which appears to give fragrance to hay and pasture land, and which is communicated undecomposed to the urine of the cow. Wilson's Rural Cyc. The berries contain an aromatic oil, which is esteemed in some parts of the country as an application to bruises, rheumatic limbs, etc. It is said to have been employed, during the

volutionary war, as a substitute for *allspice*. B. S. Barton tes that an infusion of the twigs has been found effica-us as a vermifuge; the flowers are employed in the place those of the sassafras.

A decoction of the plant forms an excellent diaphoretic nk in pneumonias, colds, coughs, etc., and as such may largely used among our soldiers in service.

The soldiers of the upper country of South Carolina, ving in the Holcombe Legion, of which I was Surgeon, ne into camp fully supplied with the spice bush for king a fragrant, aromatic, diaphoretic tea. This, and a prepared from the sassafras, I used entirely as a substi-e for gum arabic and flaxseed in colds, coughs, pneumo-ıs, etc. See "Sassafras" and "*Ulmus fulva.*" Soldiers y supply themselves with these, as they move camp, in y locality.

Laurus geniculata, Walter. Pond spice. Grows around nds; vicinity of Charleston; Newbern. This, also, is omatic.

ARISTOLOCHIACEÆ. (*The Birthwort Tribe.*)

Generally tonic and stimulating.

Aristolochia serpentaria, L. Serpentaria; snakeroot. Dif-sed. Richland; vicinity of Charleston; Newbern. Fl. ne.

Bell's Pract. Dict. Mat. Med. 420; Trous. et Pid. Mat. ed. i, 336; Ed. and Vav. Mat. Méd. 249; Eberle, Mat. ed. i, 280; Le. Mat. Med. i, 163; Frost's Elems. Mat. ed. 520; Royle, Mat. Med. 532; U. S. Disp. 658; Pe. t. Med. and Therap. i, 231; Journal de Pharmacie, vi, 5; Journal de Chim. Méd. vii, 493; Sydenham, Peechey's ans. 4th edition, 33; Ball and Gar. Mat. Med. 375; Cul-, Mat. Med. ii, 85; Bergii, Mat. Med. ii, 765; Mér. and L. Dict. de M. Méd. i, 415; Big. Am. Med. Bot. iii, 82; rray, Apparat. Med. i, 348; Chap. Therap. and Mat. d. ii, 411; Lind. on Hot Climates, 104, 254; Shec. Flora

Carol. 203; Lind. Nat. Syst. Bot. 206; Bart. M. Bot. 251; Woodv. Med. Bot.; Griffith's Med. Bot. 829; Linn. Veg. M. Med. 166; Bull Plantes Vén. de France, 83; Thornton's Fam. Herb. This plant is well known as a tonic, diuretic, and diaphoretic, of great value in the low stages of fever, as in typhus, in chlorosis, and in atonic affections of the intestinal canal; indicated where we wish to stimulate and excite at the same time a free diaphoresis and diuresis. It is also useful in promoting the cutaneous excretions in exanthematous diseases, where the eruptions are tardy. The infusion is serviceable in restraining vomiting; much use is made of this plant among the negroes in South Carolina, particularly in the low stages of pneumonia, to which they are particularly liable. I have observed the good effects of both this and the senega snakeroot (*Polygala senega*) in this affection. The dose of the powdered root is ten to thirty grains; of the infusion of one ounce to one pint of boiling water, two ounces may be taken as often as occasion requires. Its effects are increased by combining it with camphor. Dr. Thornton (Fam. Herb. *cit. sup.*) used it in typhus fever; two drachms of the tincture, combined with ten grains of the powder and five drachms of the tincture of opium, may be given every hour. It is said to add much to the efficacy of bark.

Several vegetable infusions surpass even sea-salt in antiseptic power. Sir John Pringle says that several bitters, such as serpentaria, chamomile, or Peruvian bark, exceed salt, he inferred, one-hundred and twenty times—"flesh remaining long untainted when immersed in their infusions; camphor is more powerful than anything else." Wilson's Rural Cyclop. This antiseptic power of certain vegetable substances should be compared with their medicinal effects when prescribed internally. All the articles just mentioned are, it will be remembered, employed in typhoid and low fevers. Among vegetable products vinegar is also antiseptic, and in the latter stages of low forms of fever, dysentery, etc., is highly useful. Among the astringents possessed of antiseptic properties, the tannin may be the potent agent, on account of its affinity for albumen and gelatine.

Aristolochia hastata. Rich, shaded soils. Fl. June.

U. S. Disp. 658; Am. Journal Pharm. xiv, 121. It is said to be similar in properties to the *A. serpentaria.*

Aristolochia sipho. Shec. Fl. Carol. 205. Similar in properties to the others.

Asarum Canadense, L. Wild ginger; Canada snakeroot. Rich soil; collected in St. John's. Fl. April.

U. S. Disp. 125; Pe. Mat. Med. and Therap. ii, 243; Frost's Elems. 220; Med. Journal Pharm. x, 186; Dict. Univ. des Drogues Simples, Ann. 1733; Cullen Mat. Med. ii, 473, 553; Mér. and de L. Dict. de Méd. i, 463; Big. Am. Med. Bot. i, 149; Schœpf, Mat. Med. 72, in *op. cit.;* Barton's Collection, 26, 48; Coxe, Am. Disp. 368; Lind. Nat. Syst. Bot. 206; Griffith's Med. Bot. 527 An aromatic, stimulant tonic and diaphoretic, "applicable in similar cases with *serpentaria.*" It is employed in cases requiring a medicine of this class, and is used in colic where no inflammation exists. It is valuable in colds, coughs, and female obstructions as a warm, diffusible stimulant and diaphoretic; sometimes combined with snakeroot and puccoon root (*Sanguinaria*). Dr. Firth gave it with benefit in the tetanus of children arising from cold. The leaves, dried and powdered, have powerful errhine properties. They were once considered actively emetic (Shec. Fl. Carol. 219); but this has been denied by Bigelow and Barton, *op. cit.* The root is often used as a substitute for ginger, to which it is said to be fully equal. According to Bigelow's examination, it contains a pungent, volatile oil, and a resin which communicate to alcohol the virtues of the plant, fecula, a gum, mucus, etc., *op. cit.* 153, 1. By the Anal. of Mr. Rushton, quoted in Griffith's work from the Am. Journal Pharm. x, 81, and more recently of Mr. Proctor, *ibid.* xii, 177, it is shown that the active principle is an aromatic, essential oil, and that it contains neither *asarin* nor camphor.

This plant may be given either in powder, tincture, or

infusion; dose of powder, thirty grains. It may be boiled in milk and drunk freely. A syrup may also be made.

Asarum Virginicum. Heart snakeroot. Grows in rocky soils. Fl. July.

Shec. Flora Carol. 218; Frost's Elems. Mat. Med, 219; "a stimulating diaphoretic, fully equal to the *Arist. Serp.*" Probably possessed of similar properties to the other. Milne, in his Ind. Bot. 73, alludes to this species as one of the strongest of the vegetable errhines—the roots and leaves being used. "The fresh leaves applied to the nostrils speedily terminate attacks of slight cold by the discharge which they induce." Those who snuff find it a valuable addition to tobacco—the dried leaves being powdered and mixed with it. The decoction and infusion of this were considered emetic, and great relief was said to have been afforded by it in periodical headaches, vertigoes, etc.; one scruple of the fresh or one drachm of the dried root and leaves was employed as an emetic and cathartic.

Asarum arifolium, Mich. Grows in shaded, rich soils; collected in St. John's, Berkley; near Whitehall Pl.; vicinity of Charleston. Fl. May.

Shec. Flora Carol. 217. This, no doubt, partakes of the properties of the others, if it is not identical; Linnæus proposes it as a substitute for hyppo; and Dr. Cutler says that the powdered root, in moderate doses, acts as a gentle emetic, one and a half drachm given in substance. The "tincture possesses both emetic and cathartic virtues." This, like the former, is a very powerful sternutatory; when the powdered leaves are used, the discharge from the nose will sometimes last for three days, hence it has been applied in this way with great advantage in stubborn disorders of the head, palsies, etc. "A case in which there was paralysis of the mouth and tongue was cured by one application of it."

AMARANTACEÆ. (*The Amaranth Tribe.*)

The leaves of many of the species are wholesome and mucilaginous.

Achyranthes repens, Ell. Forty-knot. Diffused; grows in Fairfield district, and in the streets of Charleston.

Ell. Bot. Med. Notes, i, 311. It is possessed of well marked diuretic properties, and is employed in ischury and dysury, and in the gravelly complaints of old persons. In Fairfield district, S. C., it has lately been employed with decided success in several cases of dropsy, but sharing the fate of all other diuretics in being sometimes inefficient in cases depending upon organic changes, or produced by causes other than those connected with the circulation. It is given in decoction—a handful of the herb to a pint of water—of which a wineglassful is taken three times a day.

Salsola kali. Saltwort.

Among the plants used in procuring *soda* in Spain are "the different species of *Salsola*, *Salicornia*, and *Batis maritima.* The *Zostera maritima* is burnt in some places on the borders of the Baltic. In this country (Scotland, see Thornton's Fam. Herbal) we burn the various species of *fuci*, and in France they burn the *Chenopodium maritimum.* In order to obtain it the carbonate must be treated like potash of commerce, with lime and ardent spirits as described before." Within the limits of the Confederate States we have all the above plants, save *C. maritimum.* Little doubt, however, exists in my mind that our several species of *Chenopodium* will be found to contain potash or soda in large amount. Some plants, "which in their native soil yield only potash, afford also soda if they are cultivated in the neighborhood of the sea." "The soda is more or less pure according to the nature of the particular plant from which it is obtained" (Thornton). Of *Salicornia*, the species are found on the coast of Florida, and northward. *Batis maritima*, L. "Salt-marshes, Apalachicola, and northward." *Zostera marina*, L. West Florida, and northward. (Chapman's So. Flora). See "*Sapindus*," in this volume.

Wilson says also of the *Salsola kali* that it is the best of our native plants for yielding "kelp, barilla, potash, and soda, and was formerly collected in considerable quantities

on our western coasts, and burned to yield soda for the manufacture of glass, and for other purposes. It grows freely from seed, and does not require any great nicety of management, yet never has been carefully cultivated." Rural Cyc. See also "*Fucus*," in this volume, for method of preparing *barilla* and *soda* from sea-weeds.

I introduce the following brief process for the manufacture of *soda*, as we have several plants in the Confederate States which furnish it. Far the best mode now adopted is to procure it from sea-water, but this may not always be attainable. "For the manufacture of soda, the marine plants are gathered at the season when their vegetation has terminated, and they are left to dry. A pit four feet square and three feet deep is dug in the earth; this is heated with split wood, and the saline plants are afterward thrown gradually in. Combustion is continued during seven or eight days; the ashes become fused in the pit, and remain in this state till the end of the process, when the combustion is completed; the whole is allowed to cool, and then the block of soda is divided into large pieces for the market." "In order that soda may possess all the requisite strength, it is necessary to separate it from the carbonic acid with which it is always united, and by which its properties are weakened. This is easily done by mixing quick-lime with a solution of soda; the acid has so strong an affinity for lime as to quit the soda to combine with it. The lye procured from this mixture is caustic, and leaves a burning impression upon the tongue; the soda thus purified acts more readily upon the bodies with which it combines. This mode of preparation is indispensable when soda is to be employed with oil in the manufacture of hard soap; it is useless when it is to be combined at a strong heat with earthy bodies, as is the case in glass-works." Chaptal also copies from M. DeSaussure's Treatise on Vegetation a very extensive table, giving the constituents of a great many plants, trees, etc., which the reader may consult. Among the plants used in preparing soda on the Mediterranean are the *Salicornia Europea*, the *Salsola tragus*, the *Statice limonium*,

e *Atriplex portulacoides*, the *Salsola kali*. We have grow-g in South Carolina and Georgia the *Salsola kali*, and the *alice Carolinana*, Walt., which should be tested, the *triplex hastata*, and the two species of *Salicornia*, mentioned ove, which also grow on our coast. To show the alliance the natural families in physical resemblances and natural operties, I find *Chenopodium*, *Atriplex*, *Salicornia*, and *Salla* all in one tribe, and each rich in potash or soda. The mitory (*Fumaria*) is one of the plants richer in potash an the wormwood (*Chenopodium*).

Salicornia herbacea, L. Glasswort. Salt marshes along ast of Georgia and Carolina.

We have two species of this genus, which is celebrated, mmercially, for the production of alkaline salts. Wilson ates of *S. herbacea* that the whole plant abounds in saline ices, and possesses a saline taste; and that it was formerly irned in common with the richly alkaline fuci in the manu-cture of kelp; that it is greedily eaten by sheep and cattle, d that it is sometimes gathered and used as a substitute r rock samphire in Scotland. See "*Salsola.*"

CHENOPODIACEÆ. (*The Goose-foot Tribe.*)

Some are wholesome, others possess an essential oil, which tonic and antispasmodic. The beet and spinach, cultivat-in the Confederate States, belong to this order.

Atriplex laciniata, L. Jagged sea-orach. Grows along t streams; Fl. July.

Shec. Flora Carol. 247 The expressed juice, in doses of ir to eight grains is said to act as a powerful purgative. cording to Schœpf, it is used as a substitute for gam-ge in dropsy and asthma.

Chenopodium anthelminticum, L. Jerusalem oak; worm-d. Diffused; collected in St. John's; vicinity of Charles-; Newbern. Fl. July.

Linnæus, Veg. M. Med.; Pe. Mat. Med. and Therap. ii, : Eberle, Mat. Med. 218; Ell. Bot. i, 331; Chap. Therap.

and Mat. Med. ii, 71; Drayton's View of South Carolina, 65; Frost's Elems. Mat. Med. 191; U. S. Disp. 206; Bart. M. Bot. ii, 183; Am. Journal Pharm. v, 180; Bergii, Mat. Med. i, 183; Griffith's Med. Bot. 538. It is well known as "one of our most efficient indigenous anthelmintics," adapted to the expulsion of lumbrici in children. Eberle employed the oil of the seeds with success in these cases, after every other remedy had failed. The dose to a child under five years is two drops; to an adult thirty drops, given on sugar grated in water. The expressed juice may be used, or a decoction of the leaves in milk, a wineglassful at a dose. The dose of the seed, for a child two years old, is from one to two scruples, mixed with syrup or bruised in castor oil. The distilled water may also be used. These plants are much employed on the plantations in South Carolina and Georgia for their anthelmintic properties, the seeds being collected in the fall.

The wormwood (*Artemisia*) of which there is a species (*A. caudata*) growing in Florida and northward, is said to be rich in potash. The *Chenopodium*, of which we have several species, although not belonging to the same natural family, is perhaps equally rich in the substance. The "wormwood is highly recommended to be converted into charcoal, to be used in the manufacture of gunpowder." See "*Salix.*" In fact, all the *Chenopodiums* (goose-foot) are also rich in alkaline salts, potash, etc., and may be used for its manufacture. The Persian insect powder, a species of *Pyrethrum* (or Persian chamomile), destroys insects with great certainty. I think it likely that some of the plants just mentioned, the milfoil (*Achillea millefolium*), the tansy (*Tanacetum vulgare*), or ox-eye daisy (*Leucanthemum vulgare*, L.), all growing in the Confederate States, may possibly be found to answer the purpose of destroying insects, lice, etc., on plants and animals. They contain a pungent oil. There is a notice of the *Pyrethrum* (*roseum*, *purpureum*, and *carneum*) in Patent Office Reports, 1857, 129. I would advise experimenting with our native plants.

See *Dasistoma* for plant hostile to insects.

I have several times stated that the allied *Artemisia*, worm-
ood, was exceedingly rich in potash. The natural affini-
es are here borne out, for the family *Chenopodioceæ* contains
any plants furnishing *soda* in large proportion. Such are
ılsola, *Salicornia*, *Atriplex*, and salt-marsh *Chenopodiums*; a
otice of species of all these genera is included in this re-
ort. They should receive the attention of the nitre manu-
cturers. Nitrate of potash "is found in the common
orseradish, in the nettle, and the sunflower." Farmer's
ncyc.

Chenopodium botrys, Ph. Jerusalem oak of some. Grows
ear Columbia. Fl. August.

U. S. Disp. 206; Le. Mat. Med. 235; Ed. and Vav. Mat.
Iéd. 304; Bergii, Mat. Med. i, 181; Mér. and de L. Dict. de
I. Méd. ii, 225; Shec. Flora Carol. 388; Dém. Élém. de Bot.
50. The juice is similar to the other, being carminative,
ectoral, emmenagogue, and vermifuge; the essential oil is
ntispasmodic, tonic, and vermifuge. An infusion, as tea,
 resolutive and expectorant, and is useful in flatulent colic,
pasmodic cough, humoral asthma, and in hysteria. The
xpressed juice of this species is given in doses of a table-
poonful, in molasses, to children affected with worms, or
ie seeds are reduced to a powder, and made into an elec-
uary with syrup. See Milne, Ind. Bot. 76; Linn. Veg.
I. Med. 41. "It is asserted," observes Shec. Flora Carol.
89, "that the whole seeds produce worms in the stomach,
nd if a parcel be baked in a loaf of bread they will gener-
te worms. Such is the belief; what credit may be due to
, I leave to the determination of those who either have,
 may hereafter, put it to the trial!"

Chenopodium ambrosioides, Ph. Vicinity of Charleston,
ach; grows in Georgia, according to Pursh; Newbern.
l. July.

Lind. Nat. Syst. Bot. The essential oil of this is also
nic and antispasmodic. U. S. Disp. 206. Plenk reports
ve cases of chorea cured by the infusion made with two

drachms to one ounce of water, of which a cupful is to be taken morning and night. Mér. and de L. Dict. de M. Méd. ii, 222. M. Mack used it, with equal success, in the hospital at Vienna, in this and in other nervous affections; see, also, the supplement to the work last mentioned, 1846, p. 165. It is employed by M. Martius in the injection of the mucous membrane of the lungs. MM. Rilliet and Barthez used it in the chorea of infants particularly. Ann. des Sci. Nat. xii, 220; Bouchardat, Ann. de Thérap. 1844; Gazette de Méd. de Saltzburg, Bill. Med. xii, 516. It is found, by chemical analysis, to possess various products, the most important of which are gluten and a volatile oil. Bull. des Sc. Méd. de Férus, vii, 225. The infusion emits a very strong, aromatic odor, and is used in parts of this country in the place of tea.

Chenopodium album, L. Richland, L. Gibbes; vicinity of Charleston, Bach.

Mér. and de L. Dict. de M. Méd. ii, 223; Phys. Med. Trans., Calcutta, ii, 40. It is a sedative and diuretic; used in hemorrhoids. Chevallier remarks the singular fact that the *C. valvaria*, a foreign species, exhales pure *ammonia* during its whole existence. This is the only observation on record of a gaseous exhalation of azote by perfect vegetables, and the facility with which this principle is abandoned by ammonia may, perhaps, explain the presence of azotic products in the vegetable kingdom. Ann. des Sci. Nat. i, 444; Lind. Nat. Syst. Bot. 209. It might be interesting to observe whether anything of this kind takes place in our species.

The above was printed by me in 1849. Worm-seed plant is said to be very rich in potash—and wormwood has been planted for the manufacture of glass—if so, the note on the subject of the *C. vulvaria* exhaling ammonia is corroborated by the above observation. I have just learned, June, 1862, that an enterprise was set on foot several years since near Columbia, S. C., to cultivate the wormwood on a large scale for the production of potash. The sugar-maple is

very rich in potash, probably the other maples also. See Salsola, *Quercus*, *Zea*, *Phytolacca*, etc., in this volume.

PHYTOLACCACEÆ. (*The Virginia Poke Tribe.*)

Phytolacca decandra, L. Poke. Diffused in rich spots; Newbern. Fl. July.

U. S. Disp. 537; Big. Am. Med. Bot. 135; Bell's Pract. Dict. 355; Bart. M. Bot. ii, 213; Am. Journal Pharm. xv, 169; Murray's App. Med. iv, 335; Kalm, Travels in N. Am. p. 197; Graffenreid, Mem. Berne, iii, 185; Schœpf, M. Med. 71; Browne, Hist. Jamaica, 232; Amæn. Acad. iv; Miller's Dict., art. Phyt. Dec.; Sprogel, Diss. Cirven. 24; Beckman, Com. 1764, 9; Allioni, Flora Ped. ii, 132; Franklin's Works, .; Cutler, Mem. Am. Acad. i, 447; Rush, i, 259; Thacher's U. S. Disp. 300; Shultz's Inaug. Diss. N. Am. Journal vi; Journal de Méd. de Corvisart Leroux, xvi, 137; Ann. de Chim. lxii, 71; Mér. and de L. Dict. de M. Méd. v, 298; Coxe, Am. Dis. 486; Lind. Nat. Syst. Bot. 210. The juice of the leaves or berries, inspissated in the sun to the consistence of an extract, will, it is said, discuss hard tumors if applied to the part, "and destroy cancers by eating them out by the roots!" (Am. Herbal, by J. Stearns.) Mixed with brandy, it is extolled in the cure of rheumatism, easing pain and producing discharge of the cutaneous and urinary secretions. One ounce of the dried root infused in a pint of wine is said to act kindly as an emetic, in doses of two tablespoonfuls. Bigelow also was of the opinion that it resembled ipecacuanha in its mode of operation; but later experimenters give an unfavorable report, as it is sometimes uncertain, acting too powerfully by accumulation. The pulverized root is also emetic in doses of one to two drachms. "The tincture of the ripe berries seems to have acquired a well-founded reputation as a remedy in chronic and syphilitic rheumatism, and for allaying syphilitic pains." By some thought to be more useful than guaiac. The decoction has been used in scrofula also. A spirit distilled from the berries killed a dog in a few moments by its violent emetic effect; and, according to De Candolle, it is a

powerful purgative. The French and Portuguese mixed it with their wine, to give it color, and this was prohibited by royal ordinance of Louis XIV, "on pain of death, as it injured the flavor!" Lind. Nat. Syst. Bot. 210; Mér. and de L. Dict. de M. Méd. states that two spoonfuls of the juice of the old plant, which is acrid, will purge violently; applied externally, it will irritate the skin, and it is used in the cure of sanious ulcers, cutaneous eruptions, itch, and hemorrhoids; for the latter affection, an infusion is injected per rectum. Drs. Jones and Kollock, of Georgia, assure us (adds Mérat) that they cure syphilis with it, in all its stages, without the use of mercury. Dr. Rush relates that several students of Yale College were severely purged from eating the flesh of pigeons which had fed on the berries. From the analysis in Annal. de Chimie, lxii, 71, it is shown to contain an enormous quantity of potash, 42 in 100 parts, and it is proposed to cultivate it for the manufacture of this article. From later examinations of Dr. E. Donnelly (Am. Jour. Pharm. ix, 168), it appears to contain gum resin 262, starch 20, potash 2, a small quantity of fixed oil, and 66.5 of woody fibre. According to the U. S. Disp., it is also somewhat narcotic, and, as an emetic, is considered very slow in its operation, sometimes not acting for several hours, and then frequently upon the bowels; but the vomiting produced by it is not attended with pain or spasm. In over doses, its effects are quite dangerous. As an alterative, the dose is from one to five grains. Dr. Griffith has also used it with success in syphilitic rheumatism. (Med. Bot. 535.) In the supplement to the Dict. Univ. de M. Méd. 1846, 557, it is said to have been used with good effect in paralysis of the intestines. Précis des Travaux de l'Acad. de Rouen, 188, 1838; Comptes Rendus Hebdom. des Sci. iv, 12, January, 1837 The ointment, prepared by mixing one drachm of the powdered root or leaves with one ounce of lard, has been applied with advantage in diseases affecting the scalp, as psora, tinea capitis, etc. Dr. Bigelow was successful with it, and Dr. Haynard cured cases in which sulphur had failed. A gentleman informs me that he has frequently seen

ne sores of secondary syphilis heal up by the application f a strong decoction of the roots. Dr. Braconnot considrs the yellow liquor produced by the juice of the berries ne of the most delicate tests of the presence of acids. Dr. hultz procured from half a bushel of the berries six pints f spirits, sufficiently strong to take fire and burn with eadiness. The root of the plant should be dug in autumn, liced, dried, and kept in close-stopped bottles.

Dr. R. Moore, of Sumter district, S. C., informs me that he berries of the poke in alcohol or whiskey, a dessert poonful repeatedly given, has been found one of the most fficient remedies we possess in rheumatism. Dr. Ballard, f the same district, has used it with satisfactory results for fty years. It is very generally employed in this way by nany. The root is commonly used. applied externally, to ure mange in dogs. The root should be dug late in utumn, or during the winter, and the powder kept in lose-stopped bottles, as it deteriorates.

An excellent *crimson dye* is thus prepared (Thornton's So. Gardener): to two gallons of the juice of pokeberries, when they are quite ripe, add half a gallon of strong inegar made of the wild crab-apple (ordinary vinegar will lo, as the writer has seen), to dye one pound of wool, which nust be washed very clean with hard soap; the wool when vrung dry is to be put into the vinegar and pokeberry uice, and simmered in a copper vessel for one hour, then ake out the wool and let it drip awhile, and spread it in he sun. The vessel must be free from grease of any kind.

The writer has seen articles dyed successfully with this lant during the present year (1862). The "Solferino" olor is obtained from it. With alum to fix the color, I ave used the juice of the pokeberry as a red ink. The lirections to the printer for this volume were written with his; before adding alum I found that the red color was ugitive. I consider it, prepared as above, an excellent ubstitute for carmine ink.

The juice of the leaf of the garden *Tanya* makes an *ndelible* dark brown dye. I would suggest that the addi-

tion of nitrate of silver, sulphate of iron, or alum would make an indelible ink for marking linen.

POLYGONACEÆ. (*The Buckwheat Tribe.*)

The leaves and roots are generally acid and agreeable.

Rumex crispus, L. Dock. Grows around buildings; diffused; collected in St. John's; Newbern. Fl. June.

Ell. Bot. 414; U. S. Disp. 606. The decoction is astringent, alterative, and tonic, uniting a laxative power with these, and resembling rhubarb in its mode of operation. It has been used with success as an alterative in itch and syphilis; the powdered root with milk, or as an ointment, is applied externally in scabies.

Dr. N S. Davis, formerly of New York, "is satisfied from his experiments and observations that the chief value of dockroot 'consists in its alterative and gently laxative qualities.' As an alterative he esteems it to be 'fully equal to the far-famed sarsaparilla.' *Quod est demonstrandum.*" Dunglison.

It is recommended as a dentrifice, especially where the gums are spongy. A decoction of the roots is used as a cooling alterative—no doubt on account of the saline constituents of this genus. The expressed juice is applied to ringworm and eruptive diseases.

It is supposed that our species possess all the virtues of the officinal; two ounces of the fresh root, or one ounce of the dried may be boiled in a pint of water, of which two ounces can be taken at a dose.

Rumex acetosella, Walt. Flora Carol. Sorrel. Sheep's-sorrel. Abundant in sandy pastures; collected in St. John's; Richland, Gibbes; Newbern. Fl. June.

U. S. Disp. 605; Pe. Mat. Med. ii, 279; Ed. and Vav. Mat. Méd. 536; Bergii, Mat. Med. i, 300; Griffith, Med. Bot. 546. This is also considered one of the most valuable of the species. It is refrigerant and diuretic, and is employed as an article of diet in scorbutic complaints; the

ung shoots may be eaten as a salad; but it is said to ove injurious in large quantities, on account of the oxalic id existing in it. The acid taste is owing to binoxalate potash and tartaric acid; this is almost destroyed by ying.

The bruised plant is often applied to sores, and it is ought to be very active in allaying inflammation—doubt- ss owing to its saline constituents.

Plants containing vegetable acid.—The acids vary during the veral stages of vegetation—these are the oxalic, citric, ma- :, tartaric, gallic, acetic, Prussic, etc. Oxalic acid has been und by M. Deyeux free in the hulls of the chickpea, and has been extracted from the expressed juice of the plant; so found in the stalks and leaves of sorrel, and in the juice all the varieties of rhubarb (Chaptal). I have seen its culiar crystals in the several plants put under the micro- ope. It is used in detecting the presence of lime, and its wer of dissolving rapidly the oxide of iron makes it eful in *stamping cotton cloths.* "In this process the whole bric is covered with a mordant of iron, which is after- ard removed by means of this acid combined with gum so that the color applied adheres firmly only to those rts where the mordant has not been destroyed." It is so used in removing ink spots from cloth.

The astringency of the root of the dock is due to tannic id, and the acidulousness of the leaves to tartaric acid d the binoxalate of potash.

Wilson observes of the *Rumex acetosa*, the "common ck" of England, which is closely related to our *R. aceto- lla*, that it has been celebrated from very ancient times for s cooling, antiscorbutic, diuretic, and gratefully esculent operties. The expressed juice of its leaves, or a decoc- on of them in whey, affords a useful drink in cases of flammatory fever, and the leaves themselves, eaten freely a salad, cool the blood, and act as either a cure or a pre- entive of scurvy. It is also much used as a salad, and as season for soups, broths, etc. Rural Cyc. Now that we ow the composition of the juices of the sorrel we can

well understand to what to ascribe its cooling and diuretic properties. There is an Italian proverb which says that the "sorrel always grows with the thistle"—the leaves of the first being particularly grateful when applied over parts irritated by the stings of the last. Our plant is not so useful as the English one.

Rumex obtusifolius, L. } Common dock. Diffused; around
" *divaricatus*, Ell. } buildings; introduced.

"A decoction of its root is highly efficacious in obstinate cases of the kind of skin disease called ichthyosis, and when taken in large quantity—as well, indeed, as the decoction of any of the fusiform dockroots—it acts as a purgative, in the same manner as the powder or the tincture of Turkey rhubarb." Wilson's Rural Cyc. Our various species of *Rumex* may upon examination be found to be capable of supplying the place of cathartics, now so difficult to obtain.

Rumex sanguineus, Walt. Flora Carol. Dragon's blood. Grows around Charleston; Newbern. Fl. July.

Dém. Élém. de Bot. 240. The root is astringent, stomachic, and eccoprotic. Linn. Veg. Mat. Med. 65. This and the seeds are used in dysentery and wounds; referred to in Mér. and de L. Dict. de M. Méd. vi, 136, as a mild astringent. Journal de Méd. xxiii, 415. Dr. Wood, in the U. S. Disp. 606, says that it may be used indiscriminately with the officinal.

Rumex Britannicus, Walt. Swamps and along streams. Fl. May. U. S. Disp. 606.

Polygonum punctatum, Ell. Sk. } Water pepper; Smart-
" *hydropiperoides*, Ph. } weed; Biting knotweed.
" *hydropiper*, Mx. } Grows in damp, rich soils; collected in St. John's, where it grows abundantly; observed in Charleston; Richland, Gibbes; Newbern. Fl. July.

Eb. Mat. Med. i, 441; U. S. Disp. 559; Ed. and Vav. Mat. Méd. 128; Le. Mat. Med. ii, 193; Ogier, in So. Journal Med. and Pharm. 1846; Mér. and de L. Dict. de M. Méd. , 433. In the Bull. Plantes Vén. de France, 140, the oung leaves are said to ease the pain of gout, and the lecoction is used with great success for dissipating old ilcers. Dém. Élém. de Bot. iii, 267 The expressed juice s an excellent diuretic, and is applied to putrid ulcers; '*aqua hujus stillatitia efficax est ad comminuendum calculum tiam vesicæ.*" See Ray's Catalogus Plantarum, 230. This plant is, however, more remarkable for its power in menorrhœa. Eberle asserts that he employed it in twenty cases, and was never more successful. Dr. Ogier, of Charleston, S. C., has published cases in the journal alluded o above, confirming its value. One to two ounces of the trong infusion is given two or three times a day, or a incture may be used.* The juice of this plant is very acrid and caustic to the taste. It is stated in the Flora Scotica, 207, that it is found a convenient and useful application for driving off flies from wounds, occurring on cattle for nstance; the decoction will dye a yellow color. Linn. Veg. Mat. Med. 71; Boyle, de Util. Philosoph. Nat. pt. ii, 59. This plant should be selected with care, as it differs out slightly from the *P mite*, and others, which possess no value. It may be distinguished by its burning taste, by he sharp, pellucid leaves, and simple flower-stalk, with the tamens and pistil of equal length. The stipules are long, runcate, and fringed, with the margin and midrib of the eaves slightly scabrous.

A writer from Manchester, S. C., 1862, recommends for our sick soldiers in camp the use of this plant in dysentery, hus: "Draw a tea strong enough to taste peppery, and ise instead of water, with or without sugar, hot or cold, as the patient may prefer. It may be drunk freely, having no unpleasant effect. It may be gathered and dried in the

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* Mr. P., of Charleston, informs me that he has repeatedly found an ointment made with the leaves give immediate relief when applied to piles in an irritable and painful condition.

shade or used fresh. Some years ago, when that disease raged in the village where I lived, I used *it only* in my household, every case recovering with scarcely impaired strength. The tea being astringent keeps up the strength.

Polygonum aviculare, L. Knotgrass. Diffused; grows in pastures and yards; Richland; collected in St. John's; observed in the streets of Charleston; Newbern. Fl. July.

Lind. Nat. Syst. 211; Mér. and de L. Dict. de M. Méd. v, 440; U. S. Disp. 558. According to the encyclopædia the root is powerfully astringent, and is used in diarrhœa, and in uterine hemorrhage. Dém. de Bot. iii, 268; Linn. Veg. M. Med. 72; Am. Herbal, 164. It is stated in the Supplem. to the Dict. de M. Méd. 1846, 578, that Dr. Bourgeois announced, in 1840, that this plant was an excellent febrifuge, and was used in middle Africa and Algeria as a substitute for quinine, and furthermore, that the assertion was not doubted. Dr. Levat Perroton, of Lyons, gives it as an excellent remedy for chronic diarrhœa, using a strong decoction for a month or more; he reports nine cases cured which had resisted other plans of treatment. See Revue Médicale, Nov. 1845; Flor. Méd. ii, 107. It has also been administered in hematemesis. This plant had some reputation in these diseases in former times. It was said to be emetic and purgative, useful in hernia, and in arresting the vomiting of blood, and was regarded as an excellent vulnerary in moderating fluxes, diarrhœa, and dysentery. Griffith, in his Med. Bot. 546, observes that the emetic property so unusual in this genus is thought by De Candolle to reside in the testa. Thunberg, in his "Voyage," mentions that in Japan they obtain a color from it similar to that from indigo.

Polygonum polygama, Vent. and Malt. }
" *parvifolia*, Mx. } Grows in sandy pine barrens; Richland district.

Big. Am. Med. Bot. iii, 129; U. S. Disp. 558. In small doses it is tonic; in large laxative and diaphoretic. Bige-

ow says the infusion is useful in imparting tone to the ligestive organs.

Polygonum convolvulus, and *scandens*, L. Grows in dry oil and pastures; collected in St. John's; vicinity of Charleston. Fl. August.

Griffith's Med. Bot. 547. "The seeds closely resemble buckwheat, and may be substituted for them."

Polygonum fagopyrum. Buckwheat. Cultivated in the Confederate States.

Rheum palmatum, and *emodii.* Rhubarb. Ex.

I insert this plant and *Beta* here, being unable at this time to place them in the natural system. The cultivation of rhubarb, rosemary, sage, rue, chamomile, and many other medicinal plants, is briefly described in the Patent Office Reports, 1854. See, also, seven articles in the "Bath papers, vol. 1," giving an account of the mode of culture in England. The superiority of foreign rhubarb is by some ascribed to a better mode of drying. Rural Cyc. See a paper translated by E. G. Smith, in Patent Office Reports, 1848, p. 604, for varieties, mode of cultivation, and relative value.

In Patent Office Reports, 1855, p. 25, is another paper on the cultivation of the medicinal rhubarb (*R. palmatum*). "In the middle and cooler parts of the United States the seeds may be sown in March in a gentle hot-bed, and when the roots are an eighth of an inch in diameter they may be carefully drawn up, preserving the top-root, and planted in a fine, rich, and deep soil," etc., etc. In the Middle and Southern states, if planted in the spring, they thrive in the open air. They should be shaded from very hot weather, and continually watered. They are, however, injured by a superabundance of moisture. In the month of August, or before, the seed-stalks should be cut off, which ought always to be done on the withering of the radical leaves, and the crowns of the plants should then be

covered with mould in the form of a hillock. The largest specimens of this drug have generally been allowed to grow six or seven years. The roots are then very large, sometimes weighing from thirty to fifty pounds. The Chinese take up their rhubarb in winter, as they then contain the entire juice and virtue of the plant. They are cut transversely into pieces of moderate size, and this should not be delayed. These are then placed on long tables or boards, and turned three or four times a day, in order that the yellow, viscid juice may incorporate with the substance of the root. They are then hung up to dry, exposed to the air and wind, but sheltered from the sun. Thus in about two months the roots are completely cured. Much loss in weight occurs in drying.

Those interested in the culture of rhubarb will find an excellent account of the success with which it was raised in England, of good quality, in Thornton's Family Herbal. Consult Pereira's Materia Medica, and other treatises on the subject. The importation of rhubarb into the Confederate States was enormous, and it commands a very high price. The greatest difference exists in the quality of the roots. Turkey rhubarb imported from Russia is the best. I will state in passing that the Report for 1855 also contains notices of the best mode of cultivating many other medicinal plants—such as the rhatany, gall-nut oak, Iceland moss, liquorice, quassia, senna, gum arabic, etc.

Beta vulgaris. Beet. Mangel-wurzel. Introduced.

Vinegar is quite important to us in the present exigency. The following method will enable us to supply the place of imported vinegar: the juice of one bushel of beet, which is easily obtained, will make from five to six gallons of vinegar, equal to the best made of elder wine. Wash and grate the beets, and express the juice in a cheese-press, or in any other way which a little ingenuity can suggest; put the liquor into a barrel, cover the bung with gauze, and set it in the sun, and in fifteen or twenty days it will be fit for use. The best vinegar is thus made. Boston Cultivator.

The saccharine matter of course soon takes on the acid fermentation. So the ripe fig, the skins, etc., added to vinegar, increases largely the amount, and large quantities can thus be easily made with the refuse or over-ripe figs, which are ready to be converted into vinegar. The juice of the watermelon can no doubt be as easily converted into vinegar or boiled down into a syrup like molasses.

The following is the ordinary process of extracting *sugar* from the beet: the roots are reduced to a pulp by pressing them between two rough cylinders. The pulp is then put into bags, and the sap it contains is pressed out. The liquor is then boiled, and the saccharine matter precipitated by quick-lime. The liquor is now poured off, and to the residuum is added a solution of sulphuric acid, and again boiled. The lime united with the acid is got rid of by straining, and the liquor is then gently evaporated, or left to granulate slowly, after which it is ready for undergoing the common process of refining raw sugars. The French manufacturers have acquired so much experience. adds Wilson, that from every one hundred pounds of beet they extract twelve pounds of sugar in the short space of twelve hours.

The Silesian or white beet is said to be the most profitable. The reader interested in preparation of sugar from cane or beet may consult Boussingault's Rural Chemistry, Law's ed. 123, 1857, Ure's Dict. of Arts and Manufactures, Wilson's Rural Cyclopædia, and Chaptal's Chemistry applied to Agriculture. In France the same land from which the beet has been cut is planted in wheat with advantage to the latter. As the cultivation of the beet may be undertaken at no distant date, I insert this brief plan by a correspondent of the Southern Field and Fireside: I will give you my plan of planting and culture of beets. In the first place I have my ground broken up deeply; then I have the ground covered over with stable manure; have it ploughed in tolerably deep; level the ground with a hoe or rake; hen-house manure is scattered over the ground; hoe it in deep with a grubbing-hoe; level it again; lay off the

rows eighteen inches apart, and the hills one foot apart; and then they will grow without any trouble. In cultivating them I have the grass and weeds cut up between the rows. I have raised beets on the above plan that weighed five and six pounds apiece.

It has been observed that beets containing sugar frequently underwent a change during winter, by which the sugar entirely disappeared, and "was replaced by *saltpetre.*" Chaptal. See, also, paper by Prof. Leconte, of the South Carolina College, on mode of formation of nitre beds; also, consult Ure's Dictionary of Arts, Manufactures, and Mines, article "Nitrate of Potash."

Coccoloba uvifera, Jacq. Sea-grape. South Florida, along the coast. Chapman.

C. Floridana also grows in Florida. The fruit of some, though very astringent, is eaten by the natives; and the wood of the tallest and bulkiest is used as timber. Wilson's Rural Cyc.

MENISPERMACEÆ. (*The Cocculus Tribe.*)

Menispermum Canadense, L. Moon-seed; yellow parilla; yellow sarsaparilla. Ell. never saw it, but *thinks* that it grows in the mountains. Dr. Gray determines a specimen sent from St. John's, Charleston district, by H. W Ravenel, Esq., to be this. Fl. July.

U. S. Disp. 1275. It is said to be much used in Virginia by physicians; and in domestic practice, as a substitute for sarsaparilla, in scrofulous and cutaneous affections. Ryddel, in his Synops. West. States, says that the roots are tonic, alterative, and diuretic. Griffith, Med. Bot. 103. It is also employed by the vegetable practitioners. See Howard's Imp. Syst. Bot. Med. 334. Said to be laxative and tonic, and used in debility and in giving tone to the stomach and nervous system.

PYROLACEÆ. (*The Winter-green Tribe.*)

Chimaphila maculata, Pursh. } Spotted winter-green. Pipsissewa.
Pyrola, " Linn. } Shaded soils; diffused; collected in St. John's; vicinity of Charleston; Newbern.

Chap. Therap. and Mat. Med. i, 313; Eberle, Mat. Med. ii, 321; Ell. Bot. Med. Notes, 505; Eat. Man. Bot. 240; Bell's Pract. Dict. 128; Mitchell's Inaug. Thesis, 1803; Ed. and Vav. Mat. Méd. 320; Pe. Mat. Med. and Therap. ii, 380; U. S. Disp. 208; Bart. Collec. ii, 21; Lind. Nat. Syst. Bot. 219; U. S. Disp. 207; Frost's Elems. Mat. Med. 281. See *P. umbellata.* "Every part of the plant is possessed of considerable activity;" and it is very valuable as a diuretic in dropsy. See Mitchell's Thesis, and Dr. Summerville's paper in Lond. Med. Chirurg. Trans. vol. v. It is particularly useful in those cases attended with disordered digestion and general debility, for in these its tonic properties and general acceptability to the stomach prove highly useful auxiliaries to its diuretic powers. It has been successfully administered in ascites, in dysuria and ischuria, gravel, strangury, hæmaturia, acute rheumatism, and in various intermittent disorders. The Indians considered it of universal efficacy; but employed it particularly in nephritic, scrofulous, and rheumatic disorders. Dr. Wood, in the U. S. Disp., states that it does prove of benefit in obstinate, ill-conditioned ulcers, and cutaneous eruptions supposed to be connected with a strumous diathesis: used both internally, and locally as a wash. The decoction and watery extract are employed.

In our present need for tonics and diuretics, in dropsy, or swelling following low and protracted fevers among our soldiers, no plant will be found more serviceable than the pipsissewa. It is aromatic, tonic, and diuretic. It can be easily collected around our camps, in shady woods, in almost every part of our Confederacy.

The black alder (*Alnus serrulata*) is an astringent diuretic. The catkins or flowerets, dissolved in whiskey, is a domestic

remedy in South Carolina—relied on by many, Dr. R. Moore informs me, in gonorrhœa in place of *copaiba*. Pills of pine gum are given together with it. The *C. umbellata*, pipsissewa, grows in North Carolina, and northward.

Chimaphila umbellata, Nutt. North Carolina, and northward.

Both the *C. umbellata* and *maculata* are used. Dr. Thompson says of the *P. umbellata:* "It is diuretic and tonic. It has been given successfully in ascites, after digitalis and other diuretics had failed; and has also proved serviceable in acute rheumatism and intermittents. It produces an agreeable sensation in the stomach soon after it is swallowed; increases the appetite, and acts powerfully on the kidneys." The whole plant is decocted.

One of these plants may be used extemporaneously in our camps for its combined tonic and diuretic properties, associated with astringency. Its uses consequently are obvious in the convalescence from fevers. It can be found in high woods near almost every locality where a regiment is pitched. See "*Eupatorium*," "Persimmon," "Dogwood," etc.

In a pamphlet issued from the Surgeon-General's office, it is stated that the *C. umbellata* "should not be gathered, as it is inferior." The decoction of either plant is made with the bruised herb one ounce, water three half-pints; boil to one pint; one pint to be given in the twenty-four hours, in divided doses. Pereira refers to both species as being useful. I have found the spotted winter-green valuable as a tonic diuretic.

Pyrola rotundifolia. Grows in South Carolina. See *Chimaphila*.

Monotropaceæ.

Monotropa uniflora. Fit-root. Grows in roads; attached to roots; collected in St. John's; Newbern.

This is used by the steam practitioners. See Howard's Impr. Syst. Bot. Med. 339.

ERICACEÆ. (*The Heath Tribe.*)

Generally astringent and diuretic.

Andromeda mariana, L. Dry soils. Richland; vicinity of Charleston. Fl. May and July.

U. S. Disp. 1238, App.: Mér. and de L. Dict. de M. Méd. i, 289; Coxe, Am. Disp. 84; Shec. Flora Carol. 156. It is employed in domestic practice; a remedy for herpes. The decoction is used as a stimulating wash for ulcers and ground itch, to which negroes are liable. The honey which bees extract from this is slightly poisonous. See Nicholson's Journal, 163.

Andromeda nitidi, Walt. Grows in damp, pine land, bogs; collected in St. John's; vicinity of Charleston. Fl. April.

Ell. Bot. Med. Notes, i, 483. A decoction of the leaves of this also is used in the cure of itch. The young branches, deprived of their pith, form good pipe-stems, see *Cliftonia;* and the bark, with copperas, yields a purple dye. Upon examination I find that the leaves contain a great deal of tannin. See "*Liquidambar*," sweet-gum, for detail of experiments.

Andromeda arborea, L.
Oxydendron arboreum, D.C. } Sour-wood, sorrel tree; diffused; grows in upper districts. I collected it in St. John's, and Spartanburg district, S. C.

U. S. Disp. 1227 The leaves, when chewed, allay thirst. A decoction of the bark and leaves is also given as a tonic.

Andromeda speciosa, Mich. Vicinity of Charleston. Bach.

U. S. Disp. 1228. It is said to be a powerful errhine.

Andromeda angustifolia, Ph. Vicinity of Charleston.

Griffith, Med. Bot. 223. This and the *A. mariana* are said to be poisonous to sheep.

Clethra alnifolia, L. (*C. tomentosa, Lam.*) Abundant in wet pine lands and swamps throughout the Confederate States.

Upon careful examination with reagents of the leaves of the plant, I find tannin in great amount. I recommend it with the leaves of sweet-gum, myrtle, etc., as a substitute for oak bark in tanning leather. See "*Liquidambar*" for detail of experiments.

Gaultheria procumbens, Ph. Spicy winter-green; partridge-berry; mountain-berry. Grows in the mountains of South Carolina, Dr. MacBride; Newbern. Fl. May.

U. S. Disp. 345; Big. Am. Med. Bot. ii, 29; Lind. Nat. Syst. Bot. 221; Bart. M. Bot. i, 178; Kalm, Amœn. Acad. iii, 14; Bart. Collec. i, 19; Raf. Med. Fl. i, 202; Griffith, Med. Bot. 425. It possesses stimulant aromatic properties, united with astringency; hence used with advantage in some forms of chronic dysentery. It is said to have also some anodyne power. The infusion of the leaves has been found beneficial in amenorrhœa attended with debility, and in promoting the mammary secretion when deficient. In the Revolutionary war it was used as a substitute for tea. The berries, which are aromatic and pleasant, are employed to flavor spirituous liquors. An infusion of them in brandy is a convenient and useful substitute for the ordinary bitters. An essential oil is obtained from the leaves by distillation. From Mr. Procter's examination (Am. Journal Pharm. viii, 211; and ix, 241) it is shown to possess acid properties, and to have the same composition as the *salicilate* of *methylene*. It is one of the heaviest of the essential oils, having a specific gravity 1.173, with a burning, aromatic taste, mixing with alcohol or ether in all proportions. This is found also in the *Betula lenta*, some of the *Spirœas*, etc. It is applied with good effect to diminish the sensibility of nerves affected by carious teeth, and to disguise the taste and smell of nauseous medicines.

Rhododendron maximum, L. Mountain laurel; wild rosebay. Grows among the mountains. Fl. July.

Lind. Nat. Syst. Bot. 221. "It is well known to be possessed of poisonous properties." Mér. and de L. Dict. de

M. Méd, vi, 75. Employed with success in chronic rheumatism, gout, and glandular enlargements. The petioles act as a sternutatory Coxe, Am. Disp. 526; Big. Am. Med. Bot. iii, 103. It is a resinous astringent, its leaves containing tannin; but its supposed poisonous, narcotic power is doubted by some, as Bigelow swallowed an entire leaf, and no bad effects resulted. B. S. Barton, however, in his Collections, i, 18, says it is certainly poisonous. The brown powder attached to the foot-stalks possesses considerable power as an errhine. The purple variety, one of the most beautiful, grows in South Carolina.

A writer under the signature of "Cunio" commmunicates the following to the "Atlanta Commonwealth," 1861: "*Wood for engraving.*—Upon the authority of Mr. Charles Foster, long known as a wood engraver at Nashville, Tennessee, many years since, I can state that the wood of the *maximum* or mountain laurel, as well as its *confrère*, *Kalmia latifolia*, known by every farmer as poison ivy, are equalled only by the best boxwood, the former of which abounds on every mountain from Mason and Dixon's line to North Georgia that has a rocky branch." I had reported the *K. latifolia* in my Sketch of the Medical Botany of South Carolina, as "possessing a wood much used for mechanical purposes, being hard and dense." See *Amelanchier* for substitutes for boxwood, which is costly.

Rhododendron punctatum, L. and Ph. Grows at the head branches of rivers in South Carolina and Georgia; "Tugoloo branches of the Savannah." Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 75; Griffith, Med. Bot. 428. A stimulant and astringent. Michaux says it furnishes to bees a deleterious honey.

Kalmia latifolia, L. Calico bush; ivy bush. Grows along rivers in upper districts; Richland, Gibbes; at Sister's ferry, Savannah river; Aiken, S. C. Fl. July.

Drayton's View of South Carolina, 69; Ell. Bot. i, 481; U. S. Disp. 1269; Big. Am. Med. Bot. i, 133; Kalm's

Travels, i, 335; Barton's Coll. i, 18, 48; and ii, 26; Thacher's Disp. 247; Thomas' Inaug. Diss., Raf. ii, 16; Griffith Med. Bot. 528. The leaves are poisonous and narcotic and animals have been poisoned by eating them. It is said that death has been occasioned by eating the flesh of partridges and pheasants that had fed on them. Dr. Shoemaker publishes two cases; see N. Am. Med. and Surg Journal. Thomas, in Inaug. Diss. Phil. 1802, reports cases of obstinate diarrhœa cured by a decoction, thirty drops being taken four times a day. The leaves have been advantageously used in syphilis, and extensively applied in tinea, psora, and cutaneous affections. Dr. Barton states that nervous symptoms have resulted from the external use of the strong decoction, thirty drops taken internally six times a day producing vertigo. Dr. Bigelow detected in the leaves tannin, a resinous matter, and gum. Besides these, Dr. Stabler finds a volatile oil of a narcotic odor and nauseous smell, supposed to be the active principle see Am. Journal of Pharm. x, 241; Griffith, Med. Bot 428. From these experiments of Dr. S. he determines it to be a direct arterial sedative, without any acrid or narcotic property; hence he supposes it suitable to cases of hypertrophy of heart, and other diseases, when it is necessary to decrease the action of that organ; and from the tannin present that it is peculiarly fitted for cases of hemorrhage, dysentery, etc. He proposes that two ounces of the leaves be macerated in a pint of alcohol for a week and then strained, the dose of which for an adult is thirty drops every two or three hours. If these observations are confirmed it will give the plant a high reputation as a sedative, and attention is invited to it. The wood is much used for mechanical purposes, being hard and dense.

Kalmia hirsuta, Walt. Grows in wet pine barrens; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, i, 483. The leaves are used by negroes, and the poorer white people, as a cure for itch, and for the mange in dogs. A strong decoction is applied

warm to the eruptions, which occasions much smarting; and it seldom requires more than one application to effect a cure.

Kalmia angustifolia, L. Sheep laurel. Barren hills; upper districts. Chapman.

The leaves of the *Kalmia* (*angustifolia ?*) exude a sweet, honey-like juice, which is said when swallowed to bring on a mental intoxication both formidable in its symptoms and long in its duration (Torrey). In this it appears closely to resemble the *Armenian azalea* (Johnston's Chemistry of Common Life, vol. ii, p. 157). About Long Island the *K. angustifolia* is believed to kill sheep, and is known by the name of sheep poison. The *Azalea pontica*, a kindred shrub, is said to be the source of the narcotic quality for which the Trebizond honey is famous.

VACCINACEÆ. (*The Bilberry Tribe.*)

Bark and leaves are astringent, slightly tonic, and stimulating.

Vaccinium macrocarpon, Ait. (*Oxycoccos.*) American cranberry. Grows in North Carolina, and northward.

The cranberry, useful for their ascescent, cooling properties, for making pies, etc., are now exported to Europe, and they are said to bring eight dollars a bushel in the London market, as they are easily transported without suffering from the voyage. They are cultivated on boggy or swampy land, sand being thrown over it to kill the grass. There is a communication in the Patent Office Reports, 1857, on the mode of cultivation of the plant. Cranberries may be preserved perfect for several years merely by drying them a little in the sun, and then putting them up closely in clean bottles. They also keep well in fresh water. The red-fruited variety yields a juice which has been employed to stain paper or linen purple.

Vaccinium arboreum, Marsh. Farcle-berry. Grows in damp soils; diffused; collected in St. John's; vicinity of Charleston. Fl. May.

Ell. Bot. Med. Notes, i, 496; Griffith, Med. Bot. 431. The bark of the root is very astringent, and is employed in diarrhœa and bowel complaints. The leaves also are astringent, and a decoction, as tea, is given in diarrhœa and dysentery, and as a wash in sore mouth; the fruit is more palatable, and equally as efficacious. The bark is also used for tanning. The root and bark are very much used as an astringent in Sumter district, S. C., given in the form of tea to children affected with diarrhœa from teething, simply because it contains tannin, I suppose, like the chinquapin, oak bark, etc. It is very much relied upon. The root is sometimes stewed in milk and given in the same way. Most of the species possess qualities similar to this one. Some of those in South Carolina bear fruit very pleasant to the taste, and are generally known as huckleberries. I regard the wood as uncommonly hard and close.

PRIMULACEÆ. (*The Primrose Tribe.*)

More remarkable for beauty and fragrance than for their sensible properties.

Anagallis arvensis, L. Red chickweed; scarlet pimpernel. Nat. on Sullivan's island. Collected in St. John's, Berkley. Fl. July.

U. S. Disp. 1227; Le. Mat. Med. i, 80; Mér. and de L. Dict. de M. Méd. i, 276; Orfila, Toxicologie, ii, 275; Woodv. Med. Bot.; Mém. Acad. Royale de Méd. 18 Mars. ann. 1826. The flowers close at the approach of rain, and occasions the plant to be called the "poor-man's weather-glass." Rural Cyc.

This plant enjoyed great reputation at one time, and was said to possess sudorific, vulnerary, antiepileptic, and antihydrophobic virtues. Woodville states that it is acrid and poisonous. It was considered very valuable for the bite of serpents, but more particularly in hydrophobia, given in

the form of powder in doses of two drachms. See the report to the Econ. Soc., Berne; Dém. Élém. de Bot. ii, 124. Milne, in his Ind. Bot. 260, asserts that it was frequently successful even after dangerous symptoms had supervened; and the great Hoffman himself yielded to this opinion. It "really possesses highly energetic powers, for Orfila destroyed a dog by making him drink three drachms of the extract." Lind. Nat. Syst. Bot. 224. It is used as a local application in ill-conditioned ulcers, and internally in visceral obstructions, dropsy, epilepsy, and mania.

Samolus valerandi, L. Brookweed. Vicinity of Charleston; grows in morasses; collected in St. John's, Charleston district. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 201; Journal Gén. de Méd. lii, 413; Dém. Élém. de Bot. ii, 121. Lemery says it is an antiscorbutic, aperient, and vulnerary.

SAPOTACEÆ. (*The Sapotilla Tribe.*)

Bumelia lycioides, Ell. Sk. Ironwood. Vicinity of Charleston, Bach; very rare in St. John's, Berkley; a tree on Sarazin Pl. (Mrs. I. S. Porcher's). Fl. June.

Griffith, Med. Bot. 441. The bark is said to be austere, and to be useful in bowel complaints. The tree is classed by some, with the persimmon, under the "ebony tribe"—the wood being characterized by great density and hardness.

EBENACEÆ. (*The Ebony Tribe.*)

Wood generally hard and black.

Diospyros Virginiana. Persimmon. Diffused; grows abundantly in both upper and lower districts. Fl. March.

Coxe, Am. Disp. 259; U. S. Disp. 302; Ed. and Vav. Mat. Méd. 135; Am. Journal Med. Sc., N. S. iv, 297; Mér. and de L. Dict. de M. Méd. ii, 657; Ann. Chim. de Montp. xxiv, 247; Shec. Flora Carol. 510; Lind. Nat. Syst. Bot.

227; Griffith, Med. Bot. 436. An astringent and stypti The inner bark is used in intermittent fever, in diarrhœ and with alum as a gargle in ulcerated sore throat. Tl powdered bark can be used wherever an astringent is r quired. The unripe fruit is exceedingly astringent; er ployed while fresh, or dried in the sun and powdered, it very valuable in diarrhœa, chronic dysentery, and uteri hemorrhage. It forms a convenient and useful prescripti for those residing in the country, made into pills or in tl shape of a spirituous tincture. Mr. B. Smith found that tl green fruit contained tannin, sugar, malic acid, and woo fibre; the first disappears, and the others increase as ripens. (Am. Journal Pharm. xii, 157.) The juice, in tl unripe state, is said to be preferable to oak bark for ta ning; and a black dye may be extracted from it. The fru when matured, is very sweet and pleasant to the taste, ar yields on distillation after fermentation a quantity spirits; a beer is made of it, and mixed with flour, a plea ant bread. I have used the wood for engraving. Eve tree of slow growth seems to me to have a dense and ha wood, because the rings are close together, though the co sistence of the interspaces varies in different plants. S "*Amelanchier*." Persimmon bark with iron yields a dye, tl color depending on the mordant used. See "*Rhus;*" al Treatises on Calico printing and on Dyeing, Ure's Dict. Arts and Manufactures, and Wilson's Rural Cyc. Process are there described. Upon testing for tannin the leaves the persimmon I find very little, but a great deal in the u ripe fruit. See detail of experiments under sweet-gur "*Liquidambar*."

I am informed by a friend that the persimmon makes particularly fine brandy. He tells me that a variety persimmons are occasionally met with in Sumter distric S. C., with fruit almost twice the size of the ordina plant. I have known of a large-fruited variety fro Cooper river also. They were found near Claremont ar the river. Ale, also, can be made with the different speci of gentian, and in England they use *G. lutea* and *purpur*

as substitutes for hops. The persimmon should be used in camps as an astringent. See "*Castanea.*"

To make Persimmon Beer.—Gather the persimmons perfectly ripe and free from any roughness. Work them into large loaves with bran enough to make them consistent; bake them so thoroughly that the cake may be brown and dry throughout, but not burned. They are then fit for use. But if you keep them any time it will be necessary to dry them frequently in an oven moderately warm. Of these loaves broken into a coarse powder, take eight bushels. Pour on them forty gallons of cold water, and after two or three days draw it off; boil it as other beer, adding a little hops. This makes a very strong beer. See Thornton's Southern Gardener, p. 138. W Gilmore Simms, Esq. writes me word that the persimmon beer manufactured in Orangeburg district, S. C., by the Hon. J. M. Felder, equalled the best sparkling "Jersey Champagne." The latter is generally made of apples, and is a species of carbonated cider. See "Apples," "Hops," "Sassafras," for method of manufacturing useful liquors.

The following, from the Southern Cultivator, was published in the Charleston Mercury:

Persimmon Beer.—The best persimmons ripen soft and sweet, having a clear, thin, transparent skin, without any rough taste. A good ripe persimmon is a delicious morsel; most animals fatten on them; the chicken, duck, turkey, goose, dog, hog, sheep, and cow, all eat them greedily. The fruit, when mashed and strained through a coarse wire sieve, makes delightful bread, pies, and pudding. When kneaded with wheat bran, and well baked in an oven, the bread may be put away for winter use in making beer, and used when wanted.

The following is one of the very best receipts for making the beer: sweet ripe persimmons, mashed and strained, one bushel; wheat bran, one half-bushel. Mix well together, and bake in loaves of convenient size; break them in a clean barrel, and add twelve gallons of water and two or three ounces of hops. Keep the barrel in a warm

room. As soon as fermentation subsides, bottle off th beer, having good long corks, and place the bottles in low temperature, and it will keep and improve for twelv months. This beer, when properly made, in a warm room is an exquisitely delightful beverage, containing no alcohol and is to the connoisseur of temperate taste not inferior t the fermented juice of the vine.

The ordinary way of making it is more simple, and th drink is relished heartily by most persons: a layer o straw is put in the bottom of the cask, on which a suf ficient quantity of fruit, well mashed, is laid, and the cask then filled with water. It should stand in a warm room and if the weather is cold, fermentation will be promoted by occasionally putting a warm brick or stone in the barrel The addition of a few honey locusts, roasted sweet po tatoes, or apple peelings, will make the beer more brisk Wheat bran always improves the quality.

A syrup made with unripe persimmons boiled in sugar is recommended as a portable and useful astringent to be used by our soldiers in camp to prevent dysenteries and diarrhœas.

(1862). The ripe fruit of the persimmon, May-apples, figs, etc., are also useful with a basis of molasses or honey in making vinegar.

Hopea tinctoria, L. Sweet-leaf. Diffused; grows sparingly in the low country; vicinity of Charleston, Bach.; collected in St. John's, Berkley; Ward swamp; Newbern. Fl. May.

Griffith, Med. Bot. 437. The root is esteemed a valuable stomachic. Ell. Bot. Med. Notes, ii, 177. Its leaves afford a yellow dye; they are sweet and pleasant to the taste, and are eaten by cattle. Major J. Le Conte informs me that the leaves and root are much used in Georgia, in syphilitic and scrofulous affections. This does not seem to be the genus *Hopea* belonging to the order *Dipteraceæ*, which furnishes such valuable resins.

STYRACACEÆ. (*Styrax Tribe.*)

Styrax. Several species grow in the Confederate States, but none are medicinal, so far as I can ascertain. It is well known that storax and benzoin are furnished by some of them.

Symplocas tinctoria, L'Her. Low woods and banks of streams. Florida to North Carolina and westward. (Chap).

The dyer's or laurel-leaved species, under the name of sweet-leaf, is used for yielding a yellow dye. Rural Cyc.

AQUIFOLIACEÆ. (*The Holly Tribe*).

These are generally astringent.

Prinos verticillatus, L. Black alder; winter-berry. Damp soils. Fl. May.

U. S. Disp. 874; Wild. Spec. Plantarum, 275; Mér and de L. Dict. de M. Méd. v, 15; Barton's Med. Bot. i, 203. The berries and bark are tonic and astringent, and are used in intermittent fevers, diarrhœas, and diseases connected with a debilitated state of the system, especially gangrene and mortification. It is a popular remedy in ill-conditioned ulcers, chronic cutaneous diseases, administered internally, and locally as a wash. Lind. Nat. Syst. Bot. 229. "The bark and berries possess in an eminent degree the properties of the vegetable astringents and tonics, combined with antiseptic powers highly spoken of." They are extensively prescribed in some parts of the country in diarrhœa, and as a corroborant in dropsy. The leaves are employed as a substitute for tea. The plant was used by the Indians. It may be taken in substance, in doses of thirty grains to a drachm, to be repeated, or a decoction made with two ounces of the bark to three pints of water, of which three ounces may be taken several times a day. A saturated tincture of the bark and berries has also been used. Bigelow did not speak highly of this plant, but W P C. Barton extols it, and recommends it to the profession,

having employed it on several occasions. Dr. Meara, in the Phil. Med. Museum; Griffith, Med. Bot. 434; Coxe's Am. Disp. 500.

Prinos glaber, L. Inkberry. Grows in damp soils, along bays; Richland district; collected in St. John's. Fl. May.

Lind. Nat. Syst. Bot. 229; Mér. and de L. Dict. de M. Méd. vi, 53. The leaves are employed as a tea. The plant probably possesses properties similar to those of the other. Upon chemical examination I find very little tannin in the leaves. See sweet-gum (*Liquidambar*) for detail of experiments.

Ilex opaca, L. Holly. Diffused; in rich soils; Newbern. Fl. May.

Griffith, Med. Bot. 432; U S. Disp. 1263. I am informed by gentlemen who have used this plant that the decoction of the bark of the root has been found very serviceable as a demulcent in colds, coughs, and incipient phthisis; and by Dr. Joseph Johnson, of Charleston, that the berries are serviceable as an emetic. It is asserted by some to possess properties fully equal to those of the *I. aquifolium* of Europe, the inner bark of which also yields a viscid substance called *birdlime;* its leaves are esteemed as a diaphoretic in the form of infusion; employed in catarrh, pleurisy, small-pox, etc. Its febrifuge virtues are supposed to depend on a bitter principle, ilicin, and the berries are considered purgative, diuretic, and emetic. The good effects resulting from the use of the *I. opaca*, in diseases affecting the mucous passages, may be owing to the substance contained in the inner bark. Some declare that they find it fully as efficient in intermittent fevers as the Peruvian bark. As an emetic, the berries are said to be more active than the leaves.

Birdlime can be made from holly and mistletoe; also from elder. The bark and juice are used. See process described in Ure's Dictionary of Arts and Manufactures, article "Birdlime." I have often noticed the mucilaginous

taste of the holly root (*Ilex opaca*), and have used it, chewed, for colds and coughs. It is also a pleasant, agreeable bitter, mucilaginous tonic. It is extensively employed in this way by many persons in South Carolina, also a tea made with the root. I would particularly recommend the holly root as an article for the relief of colds and coughs. It increases the appetite, and is a tonic. The leaves of the *Ilex opaca*, like the *Ilex dahoon* and *Ilex cassina*, are used as substitutes for green tea. See *Ilex cassina*.

I condense the following from Wilson's Rural Cyc.:

"Birdlime for catching birds, mice, and other vermin is generally made from the middle bark of the holly, which is boiled in water seven or eight hours, till it becomes soft and tender. After the water has been drained off it is laid in masses in the earth, covered with stones, and left to ferment during a fortnight or three weeks. When thus changed into a kind of mucilage it is taken from the pit, pounded in mortars until reduced to a paste, washed and kneaded in river water until freed from all extraneous matter. It is left in earthen vessels four or five days to purify itself by fermentation, and it is then put up for use or commerce. In every kingdom or district there is a different mode of preparing this substance. The mode employed by M. Bouillon Legrange is to take a sufficient quantity of the second bark of the green prickly holly, to bruise it well, and boil it in water four or five hours; to pour off the water, to deposit the bark in pits in earthen pans, to moisten it from time to time with a little water, to let it remain until it becomes viscous, and to cleanse it by washing when it has attained a proper degree of fermentation."

Birdlime may be procured from the young shoots of the common elder tree, from a number of plants, from slugs, snails, and from the pods of certain caterpillars. The common kind of birdlime readily loses its tenacious quality when long exposed to the air, and particularly when subjected to moisture; but it may be rendered capable of sustaining the action of water by the following

process: take a pound of common birdlime and wash it thoroughly with spring water till its hardness be destroyed; then pound it completely, that its water may be entirely separated, and when it is well dried put it into an earthen pot with as much goose or capon's grease as will make it run. Add two spoonfuls of strong vinegar, one of oil, and a small quantity of Venice turpentine, and let the whole boil for a few moments over a moderate fire, stirring it all the time. It is then ready for use; and this is the only kind that can be successfully used for snipes and other birds which frequent wet situations. When birdlime is to be applied for use it should be made hot, and the rods or twigs should be warmed a little before they are dipped in it. When straws or cords are to be limed it should be very hot, and after they are prepared they should be kept in a leather bag till used. In order to prevent birdlime from being congealed by cold it should be mixed with a little oil of petroleum; and, indeed, before the common kind can be used at all it must be melted over the fire with a third part of nut-oil or any thin grease, if that has not been added in the preparation. It has been found to resemble gluten in many particulars, but differs from it essentially in the acetous acid which it contains; in being very slightly animalized; in the mucilage and extractive matter which may be obtained from it; in the great quantity of resin which it yields by means of nitric acid; and in its solubility in ether. See, also, Wilson's article on "Bird-catching" for the various methods of ensnaring game. See "Viscus" in this paper.

Our *Ilex opaca* is said to resemble closely the English holly (*I. aquifolium*). It has a hard, white wood, with a fine grain. Among many trees and plants which I have examined, with a view to testing their relative hardness, I do not rank the holly so high as others. The English holly is said by Wilson to be very retentive of its sap, which renders it liable to warp unless well dried; to be susceptible of a high degree of polish, which renders it well adapted to many purposes in the arts. It readily takes a durable color of any

shade, hence used by cabinet-makers in forming what are technically called "strings and borders" in ornamental works. When properly stained black, its color and lustre are little inferior to ebony. It may be turned to a great number of purposes by turners, engineers, cabinet-makers, philosophical-instrument makers, and others. Next to box-wood, the pear tree is the best wood, says Wilson, for engraving upon, as it is compact, and stands the tool well. Rural Cyc. I do not think that I found our *I. opaca* equal to the dogwood for the purposes of the engraver; certainly when green it yielded to the graver's tools more readily, and was not so hard.

The berries of the English holly are said to be purgative, and six or eight of them swallowed will produce violent vomiting; the bark is said to be febrifugal. *Op. cit.*

Ilex cassina, Mich.
" *vomitoria*, L. and Ait. } Yaupon; cassina; emetic-holly; grows near the sea-coast; Newbern. Fl. March.

Mér. and de L. Dict. de M. Méd. iii, 591; see *I. vomitoria.* Linn. Veg. Mat. Med.; U. S. Disp. 1263, App.; Griffith, Med. Bot.; Ell. Sk. of Bot. of South Carolina, ii, 682. The leaves act as a powerful diuretic, and are employed in calculous, nephritic diseases, diabetes, gout, and small-pox. This plant is said also to act as a mild emetic. (Mér. and de L.) The Indians used the cold infusion, which was called the *black drink*, and which was said to enliven them, in the place of opium. The Creeks employed it, according to Elliott, at the opening of their councils, sending to the sea-coast for a supply. They considered it one of their most powerful diuretics. (Bart. Coll. 38.) The inhabitants of North Carolina purify brackish water by boiling in it *Cassina* leaves.

In North and South Carolina much use is made of the leaves of cassina for making tea. I would refer the reader to the *Ceanothus Americana*, New Jersey tea tree. The leaves of the common holly (*Ilex opaca*) are also recommended by some as a substitute for tea; and I would call

attention to the fact that the famous plant used so extensively in Paraguay, *Maté* or Paraguay tea, is an *Ilex* (*I. Paraguaiensis*, plants of which have been introduced by Lieut. Page, and distributed. See a notice of it in Patent Office Reports, 1854, p. 34, and 1859, p. 15. *Maté* is universally drunk in many of the South American States, and almost fabulous properties are attributed to it. "It is unquestionably aperient and diuretic, and produces effects very similar to opium. * * * Like that drug, however, it excites the torpid and languid, while it calms the restless and induces sleep." I have little doubt but that great resemblance does exist between this and the kindred plant, the cassina, from which also was prepared a "black drink," which was used by the Indians of North America in their ceremonials. The mode of preparation may be lost to us.

The *Yaupon* is sometimes referred to as *I. vomitoria.* The Indians drank it very strong, and in copious draughts, at a certain period of the year, in order to purify themselves. It acted as an emetic. The *Maté* of Paraguay is not identical, says a recent writer, with our *I. cassina.* Lawson, in his account of this plant, in his Travels in Carolina (pp. 90, 91, London, 1709), celebrates the virtues of the tea, and gives a particular account of the mode of preparing it. "This plant (the *Yaupon*, called by the South Carolina Indians *Cassina*), is the Indian tea, used and approved by all the savages on the coast of Carolina, and from them sent to the westward Indians, and sold at a considerable price." "The savages of Carolina bore this tea in veneration above all the plants they are acquainted withal," p. 221. "As for purgings and emetics they never apply themselves to, unless in drinking vast quantities of their *Yaupon* or tea, and vomiting it up again, as clear as they drink it." Croom, in quoting the above, adds that in North Carolina it is still esteemed a useful diaphoretic. Notes to his Catalogue, p. 45, referred to as *I. cassina*, of Walter.

The preparation of *Maté* is very simple. It can be gathered during the whole year. It is collected in the woods—"a process of kiln-drying is resorted to upon the spot, and

afterward the branches and leaves are transported to some rude mill and powdered in mortars. The substance, after this operation, is almost a powder, though small stems, denuded of their bark, are always permitted to remain." A small quantity of the leaf, either with or without sugar, is placed in a common bowl, upon which cold water is poured; after standing a short time, boiling water is added, and it is at once ready for use. It must be imbibed through a tube on account of the particles of leaf and stem which float upon the surface of the liquid. The plant is not cultivated. See, also, *Ceanothus* and *Thea viridis.*

Ilex dahoon, Walt. Also called cassina. Grows in swamps; it is said to possess properties similar to those of the *I. cassina.*

Ilex myrtifolia, Walt. Grows around ponds, in flat, pine barrens, forty miles from Charleston; Newbern.

Dr. Joseph Johnson, of Charleston, informs me that this is used to some extent in domestic practice in South Carolina, as a diuretic in dropsy.

CUSCUTACEÆ.

Cuscuta Americana, Linn. Dr. Engleman, of St. Louis, has determined that we have not the *C. Am.* of Linn., and he has substituted three distinct species which are found in South Carolina, the *C. compacta* and *cornuti* of Choisey, and *C. vulgivaga*, Engl. Love-vine. Grows in damp soils; collected in St. John's; Newbern. Fl. June.

Mér. and de L. Dict. de M. Méd. ii, 527; Flora Méd. des Antilles, ii, 334; Shec. Flora Carol. 485.

This is said to be laxative and hydragogue. It imparts a yellow dye to cloth. The vine may be snapped in pieces, and the divisions will retain a separate existence, throwing out new tendrils, and reattaching themselves to surrounding objects.

CONVOLVULACEÆ. (*The Bindweed Tribe.*)

An acrid, milky juice is found in their roots, which is strongly purgative, this quality depending upon a peculiar resin, which is the active principle of the jalap, the scammony, etc., plants belonging to this order.

Ipomœa nil, Pursh. } Grows in dry soil; vicinity of *Convolvulus*, Sprengel. } Charleston; St. John's; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. iv, 409. The root was employed by the ancients as a purgative.

Convolvulus, Ell. Sk. } Wild potato vine; found *Ipomœa panduratus*, of late bot. } in dry pine barrens; collected in St. John's, Charleston district, where it grows abundantly; Newbern.

Coxe, Am. Dis. 226; Barton's Collec. ii, 49; Ell. Bot. Med. Notes, i, 254; U. S. Disp. 269; Mér. and de L. Dict. de M. Méd. ii, 409; Lind. Nat. Syst. Bot. i, 252; Griffith's Med. Bot. 477. The root is diuretic, and in the form of infusion, is said to be very serviceable in calculous complaints. It is employed with great success by Dr. Harris, of New Jersey, in these and in other affections as a substitute for jalap and rhubarb; Dr. B. S. Barton says that an extract from one of our native species is little inferior to scammony. The powder or the decoction may be used.

Convolvulus macrorrhizus, Ell. } Vicinity of Charleston; *Ipomœa* of Michaux. } dry soils.

U. S. Disp. 408; Ell. Bot. Med. Notes, i, 253; Mér. and de L. Dict. de M. Méd. ii, 406; Frost's Elems. Mat. Med. 140. This is thought to resemble jalap. De Candolle mentions the root as possessing purgative properties (Essai); and the expressed juice was said to be very active. Lind. Nat. Syst. Bot. 231; Flore Méd. des Antilles, ii, 288. Dr. Baldwin, however, was of the opinion that it possessed very little purgative power. It is said to contain a great deal of saccharine with a considerable quantity of farinaceous matter.

Convolvulus Jalapa.

It has been supposed by some that the officinal jalap may be obtained from plants growing within the limits of the Confederate States, but late researches have almost disproved it. See U. S. Disp.; Mér. and de L. Dict. de M. Méd.

Batatas edulis, Chois. } Sweet potato, and its varie-
Convolvulus batatas, Cult. } ties.

This valuable plant is cultivated to a large extent in the Confederate States, and great use is made of the root as an article of food. It may, therefore, not be out of place to furnish some references to the various sources of information concerning it that have come in my way. A large quantity of sago, called "Bowen s patent sago," was made in Georgia from the potato, particularly by Dr. Bancroft, near Savannah The roots were scraped and grated, the pulp was then mashed through sieves, and the deposited flour collected and dried in pans either by fire or sunlight. See Shec. Flora Carol. The root is used as an article of food prepared in various forms. They may be grated when raw and the pulp made into a pudding; they are sometimes eaten roasted or boiled, in which state, with wheat flour, a very pleasant bread is made of them. On the plantations they furnish a large proportion of the food of animals. Mér. and de L. Dict. de M. Méd. Supplém. 1846, 205. See Depuy's Mémoire sur la culture de la patate, Bordeaux, 1801; Lelieur de Ville-sur Arce, Mém. sur la culture de la patate et du maïs, Paris; Gosse, Culture de la patate (Biblioth. Univ. de Genève, iii, 1818); Roberts Note on the culture of the potato in the Mém. de la Soc. Roy. d'Agric. 1841; Southern Agriculturist, Charleston, *passim*.

In Patent Office Reports, 1854, p. 169, is an illustrated paper on the *Dioscorea batatas*, or Chinese yam, recommended as a substitute for the potato. See *Dioscorea villosa* in this volume.

The *Cantharis vittata*, or blistering fly, can be found on the potato, and I have myself produced blistering by ap-

plying them to the hand. I collected the flies from vines growing on Daniel's island near Charleston. Mr. Townsend Glover, in a valuable paper illustrated with wood-cuts in Patent Office Reports, 1854, page 59, states that he found a species of cantharis, *C. strigosa*, in large numbers on the cotton plants near Columbia, S. C., in the month of September. I have little doubt that the Confederate States could be easily supplied with blistering ointment from these flies.

The reader interested in the appearance, nature, and history of the "insects injurious and beneficial" to plants and vegetables, is referred to the paper cited. Those infesting the cotton plant, the peach, the vine, garden vegetables, etc., are all described. I am indebted to Mr. Glover for drawings of these. See, also, Patent Office Reports, p. 88, 1855, in which the papers are continued.

A Substitute for Spanish Flies.—The present scarcity of Spanish flies for medical use in blister plasters makes a proper substitute a desideratum. A writer in the Savannah Republican says we have in this country many representatives of the same genus, and enumerates the blistering beetle, or potato fly, so prevalent in our gardens, and so injurious to vegetation, as efficacious. He says:

The blistering plaster and *Cantharides* of medicine are prepared from the Spanish flies, *Cantharis vesicatoria*, which are collected in Spain and Italy in large quantities for exportation. We have in North America many representatives of the same genus. Several species have been used for the same purpose, and in this immediate neighborhood the *Cantharis vittata, var*, striped blistering beetle, commonly called the potato fly. The blistering beetles have been enumerated among the insects directly beneficial to man, on account of the important use made of them in medical practice; yet the gardeners in our neighborhood will testify that the insect in question is very injurious to vegetation, appearing in large numbers on the Irish potato, tomato, egg-plant, and beet, which they will strip of every leaf. I have, however, remarked that they will give the

preference to a common weed, if in close proximity—an *Amarantus*—a kind of prince's feather. The insect is of a dull, tawny, or light yellowish color, with two black spots on the head, two black stripes on the thorax, and three broad ones on each wing cover. The under side of the body, the legs (excepting the first joint, which is yellowish), the *antennæ*, or feelers, are black. Its length is from five to eight lines, its breadth of body two lines. The body is quite soft. These beetles are very shy, timid insects, and whenever disturbed fall immediately from the leaves, and attempt to conceal themselves among the grass, or draw up their long slender legs and feign themselves dead. In the night, and in rainy weather they descend from the plants and burrow in the ground, or under leaves and tufts of grass. It is, therefore, during clear weather, in the morning and evening that they feed, and are to be collected. They should be killed by throwing them into scalding water for one or two minutes, after which they should be spread upon cloth or paper to dry, and may be made profitable by selling them to the apothecaries for medical use.

Dunglison, in his Theraputics, says that the *Cantharis vittata*, *Lytta vittata*, potato fly, is somewhat smaller than the Spanish fly (*Cantharis vesicatoria*), its length being about six lines. The head is of a light red color, with dark spots on the top; the feelers are black; the elytra, or wing-cases, black, with a yellow longitudinal stripe in the centre, and a yellow margin; the thorax is black, with three yellow lines; and the abdomen and legs, which are of the same color, are covered with an ash-colored down (Wood and Bache). They are first observed about the end of July or the beginning of August. They are found in the morning and evening, and are collected by shaking them from the plant in hot water, after which they are carefully dried in the sun. It resembles the Spanish fly in all its properties. Other species are found in the United States, viz: *C. cinerea*, a native of the Northern and Middle states; *C. marginata; C. atrata*, common in Northern and Middle

states; but *C. vittata* is the only one that is officinal, *op. cit. sup.* In England, according to Pereira, the blistering beetle is found on species of the *Oleaceæ*, as the ash, privet, and lilac, and upon the elder and lonicera. Cloths are spread under the trees and the flies shaken upon them or beaten with long poles; the flies are then killed by being exposed to the vapor of vinegar, hot water, or oil of turpentine.

Potato Coffee.—I have seen this used on several plantations in lower Carolina as a substitute for coffee. It is one of the best when carefully made by our Southern matrons. The following is given as the mode of preparing and using: the sweet potato is peeled and cut to the size of coffee berries, spread in the sun until perfectly dry, then parched in an oven or pan until thoroughly brown before being ground. As much as is intended to be used is then put into a cup with a little hot or cold water; it is mixed well until all is wet; boiling water is added, and it is settled like coffee.

The mucilaginous liquor prepared from potatoes washed and grated, the fecula being allowed to remain at the bottom of the vessel, is used for cleansing silk, woollen, and cotton goods without damage to the color. The coarse pulp which does not pass the sieve is of use in cleansing worsted curtains, carpets, tapestry, and other coarse goods, also in cleansing oil paintings.

Among the plants for supplying *starch*, none is superior to the sweet potato—the red-skin variety, white within, is preferred. Large supplies are made upon our plantations by grating and washing out the starch granules, then drying. See *Maranta arundinacea* in this volume for mode of making *starch;* also, Ure's Dictionary of Arts, Manufactures, etc., vol. 2, p. 462, New York, 1853, for a paper on the manufacture of sugar from the potato, with a table of the amount of *starch* in the several varieties of the potato.

HYDROLEACEÆ.

Hydrolea quadrivalvis. Immersed in ponds; collected in St. John's. Fl. July.

A bitter principle exists in this genus.

LOBELIACEÆ.

Lindley states that all are dangerous or suspicious, in consequence of the excessive acridity of their milk.

Lobelia inflata, L. Indian tobacco; lobelia; emetic-root. Grows in Spartanburg and Abbeville districts, and in Georgia. Fl. August.

Ell. Bot. Med. Notes, ii, 219; U. S. Disp. 434; Barton's Collec. 36, 56; Thacher's U. S. Disp. 267; Frost's Elems.; Mat. Méd. 83. This is one of the most valuable of our indigenous plants, well known as a nauseating diaphoretic and expectorant, possessing some narcotic power, and acting particularly on the bronchial mucous membranes. The infusion of the flowers promotes urine, diaphoresis, and the discharge of the lochia; used also in convulsions and palpitations of the heart. The juice which exudes from the plant is of a penetrating and diffusible nature; from its effects upon the eye it is called "eye-bright." The tincture, in small doses, is used to prevent colic and croup in infants, just sufficient to produce slight nausea. The plant in spirits is given largely in the bite of serpents and insects, and the tincture applied externally is said to relieve the pain caused by the stings of spiders and insects. See the "Cherokee Physician." The infusion of the plant is stimulating to the throat, and is largely employed in asthma, as it occasions a copious secretion of saliva and of mucous fluid: "It, however, sometimes operates vehemently and speedily on the stomach." Lind. Nat. Syst. Bot. 237; Mér. and de L. Dict. de M. Méd. iv, 137 Chapman, Bigelow, and Barton spoke of it as a very active and dangerous plant. Supplem. to Mér. and de L. Dict. de M. Méd. 1846, 438. Dr. Noach, of Leipsic, says that it acts specifically on the "pneumogastric nervous system," and consequently possesses such a remarkable influence on the bronchial mucous membrane. In Geneva, also, it has acquired great reputation in spasmodic asthma. See the 12th series of the Journal de Chim. et de Pharmacie, i, 454. Dr. Elliotson cured two cases in four days with the alco-

holic tincture in a sufficient quantity of distilled watei It has been found in Europe very useful in chronic bror chitis, aphony, and nervous affections of the bronchia, an in laryngitis and hooping-cough. It has been administere in convulsions, tetanus, and dance of St. Guy. Méı Supplém. See also Lancet, February 23, 1833. The Ir dians used it as tobacco, and this is a convenient way c administering it. Rufz, d'empoisonnement pratiqué pa les Nègres, 139; Sigmond on the properties of *L. inflat* and *syphilitica*, in Journal de Chim. Méd. ix, 587, 1833 Glasgow Med. Journal, May, 1828; Bidault de Villier notice sur l'emploi du Lob. inflat. dans l'asthme et comm émétique, Nouv. Biblioth. Méd. v. 226. *Lobeline* has bee extracted from it: Phil. Journal Pharm. 1834. Dr. Procto found it also to contain an odorous volatile principle, peculiar acid, *lobelic*, gum, resin, fixed oil, lignin, salts o lime, potassa, oxide of iron, etc. Am. Journal Pharm. ix 106, xiii, i. It has been used as an enema in the same wa as tobacco, and, in small doses, to produce relaxation o the os uteri. Eberle employed it with success in a case o strangulated hernia; he considers the root and inflate capsule the most powerful parts of the plant. Am. Journa Med. Sc. xvii, 248. Some have doubted whether it pro duces its effects in the same way as tobacco. Dr. Cutlei who introduced it, says if the leaves be held in the mouth they induce giddiness and pain in the head, with agitation and finally nausea. Both Dr. Randall and himself found i very efficacious in asthma, and employed it as a speed expectorant in catarrh; the latter did not observe an narcotic effect ensue from it in moderate doses. In Nev England the infusion has been used advantageously ii leucorrhœa. The active principle is extracted by wate and alcohol; hot water is said to impair its emetic power ten to twenty grains of the powdered leaves will act as aı emetic, a moiety less as an expectorant: two ounces of th dried plant are added to one pint of diluted alcohol, o which one teaspoonful given to an adult will generall bring on nausea, and sometimes vomiting. This is th

form in which it is usually prescribed in asthma, repeating it several times a day, and desisting when headache or nausea ensues. Coxe, Am. Disp. 373; Big. Am. Med. Bot. i, 179; Cutler, Mem. Am. Acad. i, 484; Schœpf, 128; Mass. Report, vi; Griffith's Med. Bot. 419; Raf. Med. Fl. ii, 22. Great use is made of the lobelia in South Carolina and Georgia—the steam and vegetable practitioners relying on it. Obstinate and very violent cases of flatulent colic, which the tinctures of cardamom, etc., fail to relieve, we know to be immediately dissipated by preparations of this plant. See Matson's Veg. Pract. and Howard's Imp. Syst. Bot. Med. 334. I have generally selected the tincture or powder of lobelia wherever I thought relaxation was required, and where there was a tendency to spasmodic action. Some physicians use the powder habitually as an emetic; others consider it too depressing for ordinary cases, and prefer ipecacuanha. The habit of giving an agent like this repeatedly, almost daily, throughout a long attack of pneumonia, must certainly be injurious; it is, nevertheless, adopted by some practitioners.

Lobelia syphilitica, L. Mountains of Carolina and Georgia; Newbern. Fl. September.

Bart. M. Bot.; Ell. Bot. Med. Notes, i, 268. In the Dém. Élém. de Bot. ii, 92, it is spoken of as an acrid and purgative plant: "Se guérissont de la vérole en buvant une décoction de cinq à six racines." Am. Herbal, 208. The Indians employed the decoction internally and topically for lues; they communicated their opinion of its virtues in this respect to Sir W Johnson, who published it in the April number of the Amæn. Acad.; Woodv. Med. Bot. 177; Kalm. L. C.; Linn. Veg. M. Med.; Thornton's Fam. Herbal, 727. Dr. Wood, in the U. S. Disp. 436, allows its emetic, diuretic, and cathartic properties, but denies it any value in syphilis. Dr. Chapman states that it is beneficial in dropsy. It is less powerful than the *L. inflata*, but more diuretic and diaphoretic; its diuretic effects are produced by free doses, purging or vomiting as it is augmented.

From an analysis by M. Boissel, it is found to contain fatty, butyraceous matter, sugar, mucilage, a volatile bitt substance, some salts, etc. Mér. and de L. Dict. de M Méd. iv, 138; Des Bois de Rochefort, Mat. Méd. ii, 21! Dict. des Drogues, iii, 378. For analysis, see Journal (Pharm. x, 623; Kalm. Description du Spécifique cont le Mal. Vénérien, in the Mém. de l'Acad. de Storck, x 1750.

Lobelia cardinalis, L. Cardinal flower. Grows in inu dated soils, roots often immersed; vicinity of Charlestoı collected in St. John's, Charleston district; Richland, Prc Gibbes; Newbern. Fl. July.

Ell. Bot. Med. Notes, i, 268; Drayton's Views, 77; U. S Disp. 436; Mér. and de L. Dict. de M. Méd. iv. 13 De Candolle's Essai, 189; Journal de Pharm. iii. 47(Bart. M. Bot. ii, 186; Lind. Nat. Syst. Bot. 236; Griffith Med. Bot. 421. This plant is used by the Indians as a anthelmintic—some say quite as efficient as the pinkroo (*Spigel, Maryland.*) Mérat says it is employed as a poisc by the negroes at the Cape of Good Hope. It is we known for its beautiful scarlet flowers.

CINCHONACEÆ. (*The Coffee Tribe.*)

The grand features of this order are powerful febrifug properties in the bark and emetic in the root. Quinquir represents the first and ipecacuanha the second.

Pinckneya pubens, Mich. Georgia bark. "Found froı New river, South Carolina, along the sea-coast to Florida. Vicinity of Charleston, Bach. Named in honor of Geı C. C. Pinckney. Fl. June. Plants sent to me by Dr. I P. Pope from Bluffton, S. C.

Ell. Bot. Med. Notes, i, 267; Coxe, Am. Disp. 1830; U S. Disp. 128; Frost's Elems. Mat. Med. 519; Griffitl Med. Bot. 366. It was said by Michaux in his N. An Sylva to be very useful in intermittent fever. Dr. Lav of Georgia, cured six out of seven cases with it. It di

not distress the stomach, though to two patients one ounce was given at a dose; one drachm is the usual quantity in which it is administered. Dr. Farr detected a considerable amount of *cinchonine* in it, but was prevented from completing his examination. The attention of those residing where it may be found is invited to it as a substitute for quinine. In Georgia a handful of the bark is boiled in a quart of water till the liquid is reduced to one-half; the infusion is given.

Mitchella repens, L. Mitchella; partridge-berry. Vicinity of Charleston; grows in shady swampy lands; collected in St. John's. Fl. May.

Ell. Bot. Med. Notes, 199. An infusion of the stems and leaves is used in dysuria, its diuretic powers, however, not being of any importance. The "Cherokee Doctor" declares that the "decoction taken freely is an excellent article to facilitate childbirth. It should be used daily for two or three weeks before that period!" The fruit is slightly acid, and is edible.

Cephalanthus occidentalis. Button-bush. Grows along rivulets in damp soils; collected in St. John's; specimens from Aiken; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, 187; Drayton's View, 62; Mér. and de L. Dict. de Méd. ii, 176; Shec. Flora Carol. 376. The decoction has been used in palsy. Elliott states that the inner bark of the root is frequently employed in obstinate coughs. Mérat notices it as an anti-venereal. A writer in the "Mercury" says: "The root of the *buttonwood* or *crane willow*, a shrub which is conspicuous in our swamps in the spring, when boiled with honey and cumfrey, makes a pleasant syrup, which is the most effective remedy known to me in diseases of the lungs. It is thought by many intelligent persons to be a radical *cure for consumption.*"

Coffea Arabica, L. Coffee. Exotic.

Should the culture of coffee be attempted in the Con-

federate States, I would refer the reader to Patent Offic Reports, Agriculture, 1858, p. 313, for an instructive con densed report on the mode of cultivation in Jamaica Central America, and other countries, with the mode o planting, harvesting, curing, etc., etc. See "Potato" an "Rye" for substitutes for coffee.

RUBIACEÆ. (*The Madder Tribe.*)

Rubia tinctorium. Madder. Exotic.

Any one interested in ascertaining what amount of an plant, vegetable or agricultural product was exported fror or imported into the United States, can obtain a list c quantities and value in Patent Office Reports, 1858.] serves to show the consumption of certain articles, th demand for them, and the consequent necessity for thei cultivation. I find upon consulting these tables, tha madder, for example, was imported to an enormou amount, twenty million pounds, for calico-printing, dye ing, etc.; a plant which might be cultivated within ou limits. See method, Patent Office Reports, 1855. So, also soda, barilla, coffee, and numerous other articles which w are or were in the habit of importing. We may fin among the genus *Galium* some plants yielding dyes- *Galium trifidum*, L. and *hispidulum* (*Rubia Brownii*, Mx. grows from Florida to North Carolina. *G. verum*, foun in England, contains so much pigment as to have bee cultivated in place of madder. "Its flowering tops boile in alum dye a bright yellow color, its roots yield a red dy equal to that of madder, and the whole of the plant whe bruised has the property of curdling milk, and is some times employed both for coloring and flavoring milk in tended for cheeses;" hence called cheese-rennet. Rur Cyc.

Since writing the above I see it stated by Pursh that th Indians use our *G. trifidum*, L. (*G. tinctorium*) for dyein their porcupine quills, feathers, leather, etc., of a beautifu red color.

Oldenlandia, *Houstonia*, *Hedyotis*. These plants, growing abundantly in the Confederate States, and belonging to the madder tribe, should be experimented with for tinctorial purposes.

CAPRIFOLIACEÆ. (*The Honeysuckle Tribe.*)

Independently of the fragrance and beauty of these plants, astringent and purgative properties are possessed by some of them.

Triosteum perfoliatum, Linn. Fever-root; wild ipecacuanha; wild coffee; horse gentian.

Bart. M. Bot. i, 59; Barton's Collec. 29; Ell. Bot. Med. Notes, i, 271; Big. Am. Med. Bot. i, 91; Raf. Med. Fl. i, 59; Griffith, Med. Bot. 353. This plant acts as a gentle but certain cathartic, particularly when combined with calomel, when its operation is almost as marked as that of jalap. The bark of the root is also emetic, the leaves and stalks proving less powerful. To produce its cathartic effect Bigelow finds a somewhat larger dose than that of aloes or jalap necessary, though it is supposed to be influenced by age. Rafinesque says the leaves are also diaphoretic; and it is stated by Dr. Muhlenberg that the hard seeds, properly prepared, are a good substitute for coffee. Randall, in his communication to the Linnæan society, asserts that water extracts its virtues best; but it is now recommended to be treated with alcohol. The decoction is said to be used by the Cherokee Indians in the cure of fevers; also given hot in colds and female obstructions. The dose as a purge is from ten to fifteen grains of the extract, and twenty to thirty grains of the powdered root. Dose of the extract from ten to twenty grains.

Triosteum angustifolium, Linn. Grows in South Carolina. Dr. Tinker's weed.

Griffith Med. Bot. 353. Possesses properties similar to those of the *T. perfoliatum*.

Lonicera sempervirens, Ait. and T. and G. } Woodbine.
Caprifolium, Ell. Sk. } Grows in wet swamps; more abundant in lower country; vicinity of Charleston; collected in St. John's. Fl. May.

Mér. and de L. Dict. de M. Méd. iv, 143. The plant is not much used in medicine. The syrup made of the leaves is given in asthma, and in angina tonsillaris. The leaves and bark of the *L. caprifolium* of Linn. are styptic and acrid; the flowers diuretic; the latter in decoction calm the pain of colic (coliques ou tranchées) following childbirth.

Diervilla trifida, Mœnch. and T. and G. } Bush honey-
" *Canadensis*, Ell. Sk. Muhl. } suckle. Grows
Lonicera diervilla, Linn. } in the mountains of South Carolina and Georgia. Fl. June.

Dém. Éém. de Bot. iii, 554. The leaves possess a narcotic principle, inducing nausea, and are recommended as a gargle in catarrhal angina. The decoction calms the pain attending the disease; taken largely it causes stupor and catalepsy.

Sambucus Canadensis, Linn. Elder. Grows abundantly in South Carolina along fences, and in rich, damp soils; diffused; Newbern. Fl. June.

Lind. Nat. Syst. Bot. 248; Bell's Pract. Dict. 404; Drayton's View, 55; Le. Mat. Med. ii, 325; U. S. Disp. 625; Royle, Mat. Med. 423; Cullen, Mat. Med. ii, 534; Mér. and de L. Dict. de M. Méd. vi, 196; Griffith, Med. Bot. 354. "The leaves are fetid, emetic, and a drastic purgative;" the plant acting in the same way as the European species, the *S. nigra*; the leaf-buds also operating as a powerful purgative. The flowers are excitant and sudorific, and are used in the form of an ointment as a discutient. The inner bark is a hydragogue cathartic and emetic, acting well in dropsy, and as an alterative in various chronic diseases. The purgation which results from its employment is sometimes, however, too severe. The berries are diaphoretic and aperient, and are used as a remedy in

rheumatic gout and syphilitic affections. The juice of these diluted with water furnishes a cooling and valuable laxative drink. This plant is employed to some extent in domestic practice for the purposes severally referred to above. A decoction made by pouring boiling water over the leaves, flowers, or berries of the elder is recommended as a wash for wounds to prevent injury from flies. An ointment used for the same purpose is prepared by stirring the elder or mixing the juice into lard while boiling, and straining through a coarse sieve. Beeswax may be added. According to Mr. Cozzens, the ripe berries afford a delicate test for acids and alkalies.

The leaves of the English elder (*S. nigra*) are noxious to insects, moles, etc. The flowers are used in fomentations and cooling ointments. "The leaves boiled in lard make one of the most emollient and suppling unguents known to the farmer. The flowers are used for making a perfumed, distilled water. The berries, according to experiments of M. Wehrle, of Vienna, produce a comparatively much larger quantity of spirits than can be obtained from the malt of the best wheat. The juice in these experiments was expressed from the berries, treated in the same manner as the must of grapes, and afterward distilled." Wilson's Rural Cyc. It would be interesting to ascertain to what extent our species share the above properties.

COMPOSITÆ.

These embrace four orders, all of which are distinguished by bitterness, which in the different sections is variously combined. In the order ASTERACEÆ it assumes a particular character, being united with a resinous principle; in the CYNARACEÆ this bitterness depends upon the mixture of extractive with a gum, which is sometimes yielded in great abundance; the CHICHORACEÆ are characterized by a juice, which is milky, bitter, astringent, and narcotic.

Vernonia angustifolia, Mx. Grows in the pine lands in lower country; collected in St. John's. Fl. July.

The root is used by the negroes in South Carolina as a remedy for the bite of serpents. It is also considered by them to be aphrodisiac.

Liatris odoratissima, Walt. Wild vanilla. St. John's, S. C.; Wassamasa swamp; North Carolina, near sea-coast (Croom).

Very aromatic. Used for scenting cigars.. The aroma is abundantly given out when trodden upon by horses' feet.

Liatris squarrosa, W Grows in pine lands; collected in St. John's; Richland district; vicinity of Charleston.

U. S. Disp. 1273; Journal de Chim. Méd. v, 419. "Y sont usitées contre la morsure des serpens." Mér. and de L. Dict. de M. Méd. iv, 97.

Liatris scariosa, W Grows in pine lands; vicinity of Charleston. Fl. July.

U. S. Disp. 1273, Appendix. It is employed in gonorrhœa, and as a gargle in sore throat.

Liatris spicata, W Grows in wet pine lands; collected in St. John's, Charleston district; vicinity of Charleston; Newbern. Fl. July.

U. S. Disp. 1272. One of the "rattlesnake's masters." Dr. Barton said that all the tuberous-rooted *Liatres* were active plants.

This plant, called "button-snakeroot" by some, is reported to be a stimulant, diuretic, and expectorant; also possessing powers as an anodyne; it is consequently given as a remedy in colic, the tincture or the decoction of the root being employed—said to resemble senega snakeroot, and to excite a flow of saliva when chewed.

Eupatorium perfoliatum, Linn. Thoroughwort; boneset. Grows in damp soils; diffused; Richland district; common in low country. Fl. July.

Chap. Therap. and Mat. Med. i, 387, and ii, 435; Bell's

Pract. Dict. 197; Ell. Bot. Med. Notes, ii, 303; Pe. Mat. Med. and Therap. 389; Frost's Elems. Mat. Med. 216; Eberle, Mat. Med. ii, 216; Royle, Mat. Med. 445; U. S. Disp. 319; Ed. and Vav. Mat. Méd. 197; Big. Am. Med. Bot. i, 34; Thacher's Am. Disp. 217; Am. Med. Record, iii, 331; Barton's Essay to Mat. Med. 28; Ball. and Gar. Mat. Med. 315; Schœpf, Mat. Med. 121; Guthrie, in Annal. of Med. iii, 403; Anderson's Inaug. Thesis, New York; Mér. and de L. Dict. de M. Méd. iii, 177; Coxe, Am. Disp. 271; Shec. Flora Carol. 549; Bart. M. Bot. ii, 133; Lind. Nat. Syst. Bot. 253. A warm infusion of this plant is emetic, sudorific, and diaphoretic; employed cold as a tonic and febrifuge. The hot decoction may be given in the hot stages of fevers without exciting the system. Small quantities of the cold infusion, repeatedly given will, it is said, purge, and are prescribed in constipation. The leaves and flowers, in powder, also purge, given in doses of ten to twenty grains. The discharge of bile is promoted by it. It has been repeatedly prescribed with advantage in rheumatism, typhoid pneumonia, catarrhs, dropsy, and in the influenza which prevailed at the North, and which was described by Dr. Rush; he also used it with great success in the yellow fever of 1798; and Dr. Chapman found it one of the most effectual remedies in the epidemic called the "break-bone fever." Graves, of Dublin, has made much use of it in the ship, or typhus fever. See note to Graves and Gerhard, Am. ed. This plant is extensively employed among the negroes on the plantations in South Carolina as a tonic and diaphoretic in colds and fevers, and in the typhoid pneumonia so prevalent among them. In a few cases which have come under my observation, I have found this and the senega snakeroot (*Polygala senega*) convenient and useful prescriptions in this disease; the latter, with tartar emetic solution, to promote expectoration; and the former, with flaxseed tea, as a stimulant diaphoretic, combining them with spirits of turpentine when it has assumed the typhoid form. From its action on the capillaries, it has been recommended in chronic cutaneous diseases. Barton

said it possessed no power in this respect; but in the hands of Dr. Zollickoffer it has proved eminently successful in tinea capitis, given in combination with cremor tartar. See Griffith, Med. Bot. 391. In the Supplem. to the Dict. de M. Méd., 1846, it is reported to have been given with benefit in asthma. Echo du Monde Savant, 16; Janvier, 1845. The infusion of the roots and leaves is usually preferred, of which one to three ounces may be taken several times a day; of the root, in powder, the dose is thirty grains. As an emetic and cathartic a strong decoction is used, made by boiling an ounce of the herb in three half-pints of water to one pint; given in doses of one or two gills or more. Given hot, it acts as a diaphoretic; cold, as a tonic.

Thoroughwort or boneset tea used hot, in the cold stages of malarial fever, and cold in the hot stages, is believed by many physicians in South Carolina, who have used it since the beginning of the war, to be the very best of our indigenous antiperiodics as a substitute for quinine. It is thought to be superior in this respect to either poplar bark (*Liriodendron tulipifera*), willow (*Salix*), or dogwood. It is also an excellent stimulating diaphoretic in low fevers.

The plants just mentioned, the blackberry, chinquapin, (*Castanea*) and dogwood to be used as astringents, the gentians, pipsissewa, *Sabbatia*, etc., as bitter tonics, can easily be obtained by our soldiers while in camp, and they will be found to fulfil all the indications required in most cases of fever, dysentery, diarrhœa, catarrhs, etc. In the formation of demulcent drinks, as substitutes for flaxseed and gum-arabic, the roots and leaves of the sassafras, and the leaves of the *Bené* (*Sesamum*) will suffice. The *Podophyllum* (wild jalap) will supply the purgative; therefore, with the possession of opium and calomel, the surgeon *in the field* can himself obtain almost everything desired, and with comparatively little aid from the Medical Purveyors. Our chief desiderata now are the preparations of potash, viz: nitrate chlorate and bicarbonate, and sup. carb. of soda. We may procure soda from our *Salsola kali.*

The winter-green (*Chimaphila umbellata*) is both tonic and

diuretic, and may be given with advantage in dropsy. In examining (1862) the excrescences produced by an insect on nearly all the leaves of the cotton-wood tree (*Populus heterophylla*, L.) I find them possessed of an intensely bitter principle, which may be made useful as a tonic given in spirits. The cinquefoil (*Potentilla*) is mucilaginous, and I am informed that in Sumter district, S. C., it is used with great advantage as a remedy in affections of the lungs, chronic colds, etc. The "Indian doctors" make a pill to act upon the liver, which they call the "hepatic pill," by boiling thoroughwort leaves until their strength is extracted, then strain the decoction and continue boiling till it becomes thick—an extract in other words. It is made up with starch into pills, and three are given at a dose. See "Indian Guide to Health."

Eupatorium purpureum, L. Purple thoroughwort; gravel root. I have a specimen from Abbeville district from Mr. Reed; Richland district; collected in St. John's, Charleston district;. grows in damp or inundated soils; vicinity of Charleston. Fl. July.

U. S. Disp. 319; Mér. and de L. Dict. de M. Méd. iii, 177. It is said to operate as a diuretic; and it is one of the popular remedies for calculus, probably possessing properties somewhat similar to those of the *Eup. perf.*

Eupatorium teucrifolium, W and T. and G. } Wild
" *verbenæfolium*, Ell. Sk. } horehound.
Grows in damp soils; collected in St. John's. Fl. August.

Michaux, Flora Amer. ii, 98; U. S. Disp. 319. This is tonic, diaphoretic, diuretic, and aperient. A popular remedy in intermittents. See observations of Dr. Jones, of Georgia. It may be substituted in some cases for the *Eup. perfol.*

Eupatorium rotundifolium, L. Grows in dry pine barrens; collected in St. John's, Berkley; vicinity of Charleston; Richland district. Fl. July and August.

Mér. and de L. Dict. de M. Méd. iii, 177; Journal Gén.

de Méd. xxxvi, 111. The infusion is said to be useful in consumption. See Dr. Mitchell's letter.

Eupatorium fœniculaceum, Willd. Dog-fennel.

This plant is said to tan leather in an extraordinarily short space of time, by a process which attracted much attention during the fall of 1861. Strange that in my examination of this plant, with that of others, I found that it contained scarcely a trace of tannin. But the common name of dog-fennel has been applied to the ox-eyed daisy (*Leucanthemum vulgare*, Lam.), and to the wild chamomile (*Maruta cotula*), or stinking Mayweed. Since my publication advising the myrtle as a material for tanning, I see a notice of its being used by Mr. Cummings for the purpose. It is believed by some that the presence of this plant indicates the existence of the cause of malarial fevers. It is used to keep off insects and bugs by strewing on the floors of cellars and dairies.

The Tallahassee Floridian (1861) says:

"*Leather tanned by the new process.*—We have seen a specimen of kip leather said to be tanned by Isaac Bierfield, of Newberry, S. C., in twenty days, with his dog-fennel preparation. The sample was soft and pliable, and had all the appearance of being equal to the best French leather. We understand that our shoemakers so pronounce it.

"Everybody knows what dog-fennel is, and will be glad to learn that it is of some account after all. The weed grows in great abundance and perfection in all parts of Florida. Mr. Bierfield says that now is the time to gather it, and that it should be put under shelter. Planters would do well to lay by a goodly portion of it, as it may prove highly valuable in the manufacture of their leather."

I have not been able to procure, by application made to Mr. Bierfield, any specimens of the plant.

Aster tortifolius, Mx. Mouse-ear. Vicinity of Charleston; grows in dry pine barrens; collected in St. John's.

This plant has some reputation in domestic practice in South Carolina as a diuretic. I have noticed the summit generally covered with little insects.

Aster cordifolium. Grows in rich lands. Fl. August.

Griffith, Med. Bot. 387. It possesses antispasmodic properties. A small species (*Diplopappus linarifolius*, Hooker, *Aster*, Ell. Sk.) grows in pine barrens, St. John's, S. C., the leaves of which contain an unusual amount of silica; they are employed to polish horns, and as a substitute for sandpaper.

Erigeron Canadense, L. Colt's-tail; flea-bane. Common in damp, sandy soils; collected in St. John's; vicinity of Charleston; Richland, Gibbes; Newbern. Fl. July.

Royle, Mat. Med. 447; Matson's Veg. Prac. 368; U. S. Disp. 316; Mér. and de L. Dict. de M. Méd. iii, 140; Journal de Bot. 448; et des Pharm. 214; Coxe, Am. Disp. 268; Griffith, Med. Bot. 395; Dém. Élém. de Bot. 200; Raf. Med. Fl.

This is a stimulant tonic, diuretic, and astringent, employed with marked success in dropsy and diarrhœa; it is much used by the vegetable practitioners in the latter disease; they give a teacupful of the infusion of the herb in hot water every two hours; when chewed it relieves cholera morbus. Dr. Depuz found it useful in these diseases. See his observations quoted in the U. S. Disp. 316. He found tannin, gallic acid, and volatile oil among its constituents, from whence its beneficial action in the diseases specified may be inferred. An infusion of the powdered flowers is antispasmodic, and is employed in hysterical and nervous affections. The oil obtained from the plant possesses extraordinary styptic properties. The dose of the powder is thirty grains to one drachm.

Erigeron Philadelphicum, L. Non. Ell. Frost-root. Common in pastures; collected in St. John's; vicinity of Charleston. Fl. May.

Lind. Nat. Syst. Bot. 253; Shec. Flora Carol. 537;

Royle, Mat. Med. 447; Bart. M. Bot. i, 234; U. S. Disp. 317. It is diuretic, without being offensive to the stomach. Fr. Elems. 81. In great repute as a remedy in calculus and in nephritic diseases. It was a favorite prescription in Philadelphia in dropsy, and Dr. Wistar recommends it in hydrothorax complicated with gout. The plant is officinal. One ounce of the plant to be administered in infusion or decoction of one piut in twenty-four hours.

Erigeron strigosum, Muhl. Grows in sandy soils; vicinity of Charleston.

Griffith, Med. Bot. 396. It is similar in properties to the *E. annuum*, a favorite diuretic in the dysuria of children—used by Physick and Dewees in painful micturition dependent on nephritis. This also yields a styptic oil similar to that afforded by the *E. Canadense*.

Erigeron pusilum. Grows in pastures and cultivated soils; collected in St. John's. Fl. June.

U. S. Disp. 316.

Solidago odora, Ait. Golden rod. Grows in rich soils, among the mountains, and in the upper districts, according to Ell. Collected in St. John's also; Newbern. Fl. October.

Mér. and de L. Dict. de M. Méd. 437; U. S. Disp. 679; Big. Am. Med. Bot. i, 189. An aromatic, moderately stimulant, and carminative plant, and like other substances of the same class, diaphoretic in warm infusion. It is used to allay pain from flatulence, lessen nausea, and cover the taste or correct the operation of irritating or unpleasant medicines. Mérat states that the infusion is also employed as an astringent in dysentery, and in ulceration of the intestines. Journal Gén. de Méd. xxxvi, 3. When the leaves are subjected to distillation a very aromatic, volatile oil collects, and an essence may be made by dissolving this in proof spirits. This will also stop vomiting and correct the taste of medicines, even laudanum and castor oil;

Griffith, Med. Bot. 397, observes that it is valuable in allaying the pain from headache, externally applied. It is much used in the Eastern states, and Bigelow thinks it will entirely supplant more expensive articles. According to Pursh, the dried flowers are a pleasant and wholesome substitute for tea.

Solidago Canadensis, L., } Margin of fields. Used in
" *procera*, Ell. } Canada as a most valuable dye.
The leaves and flowers of the English species are used for making a yellow dye; said to be as good as woad. Eng. Flora, v. iii, Farm. Encyc. Its stalks are numerous, straight, and grow almost five feet in height; they afford very strong fibres if treated in the same manner as hemp.

Solidago sempervirens, L. Narrow leaf golden-rod. Grows in wet lands; vicinity of Charleston. Fl. September.

Mér. and de L. Dict. de M. Méd. vi, 437 Very efficacious in the cure of wounds.

Inula helenium. Elecampane. Mountains of North Carolina. Chap. Introduced.

Inuline, a vegetable substance of closely kindred nature to starch and dextrine, was discovered by Rose in *Elecampane*, and takes its name from the old botanical designation of that plant (*I. helenium*). It is spontaneously deposited from a decoction of the roots of *Elecampane*, and it constitutes the greater part of the solid matter of the tubes, both of the dahlia and the Jerusalem artichoke. It is a white powder, and consists by analysis of Payen of 46.6 per cent. of carbon, 6.1 of hydrogen, and 49.3 of oxygen. It is soluble in hot water, being distinct from both gum and starch by its insolubility in cold water. But when exposed to a temperature of three hundred and seven degrees, it completely melts, acquires new properties, and becomes soluble both in cold water and in alcohol. Boussingault showed that it is not colored by iodine, while acetic acid, which is without action on starch, produces with inuline

precisely the same effects as the sulphuric and other acids; finally, diastase, whose reaction upon starch is so peculiar, so prompt, and so powerful, does not cause any change in inuline. It is, therefore, easy to separate these two substances when they are mingled, by heating the mixture either with acetic acid, which dissolves the inuline, or with diastase, which dissolves the starch. I insert the above from Wilson's Rural Cyc. and Boussingault's treatise on account of the interesting nature of the product. See, also, works on chemistry. The roots should be dug in autumn, and in the second year of their growth, as when older they are apt to be stringy and woody. The dried root has a very peculiar and agreeable aromatic odor, slightly camphorous. The taste at first is glutinous and somewhat similar to that of rancid soap; upon chewing it becomes warm, aromatic, and bitter. In its medical properties, elecampane is tonic and gently stimulant. By the ancients used in diseases of females; in the United States mostly confined to diseases of the lungs. It has also been extolled when applied externally for the cure of itch, tetter, and other diseases of the skin. Farmer's Encyc.

Baccharis halimifolia, L. Sea myrtle; consumption weed. Grows along the sea-coast; collected in St. John's, where it is found in abundance; vicinity of Charleston; Newbern. Fl. October.

Shec. Flora. Carol. 256. This plant is of undoubted value, and of very general use in popular practice in South Carolina, as a palliative and demulcent in consumption and cough; I have frequently seen it used with advantage, and have often heard those employing it confess the benefit derived from it. A strong decoction of the root may be drunk several times a day. It is slightly bitter and mucilaginous to the taste. No analysis has yet been made, so far as I can learn. Shecut states that the "bark is said to exude a gum so much resembling honey as to attract bees in great numbers." This, like many others of our indigenous plants possessed of unequivocal utility, is unnoticed in the dispensatories and other works.

Pterocaulon pycnostachyum. Grows abundantly in dry pine barrens; collected in St. John's, Berkley. Fl. July.

Ell. Bot. Med. Notes, ii, 324. Much use is made of this plant in St. John's, Berkley, as an alterative; it is supposed to be possessed of decided value. It is well known as the blackroot of the negroes. A decoction of the root is given several times a day.

Xanthium strumarium, L. Burr; burdock. Grows abundantly in cultivated lands; collected in St. John's, Berkley; vicinity of Charleston; Richland, Gibbes. Fl. August.

Mér. and de L. Dict. de M. Méd. vi, 970; Dioscorides, lib. iv, 133. It has been used in scrofula. The only works in which we have been able to find any account of it are the Dém. Élém. de Bot. iii, 91, where the leaves are said to be astringent, the seeds diuretic, and the expressed juice useful in affections of the bladder, and as an auxiliary remedy in the treatment of ringworm; also in Linnæus, Vegetable Mat. Med. 172, according to which it is found beneficial in herpes and in erysipelas; hence, we may infer that it has at any rate some power as an alterative. Its leaves afford a yellow dye. No use is made of it in South Carolina or Georgia, so far as I can ascertain. The plant is considered a nuisance by farmers, as the burrs get entangled in the wool of sheep, from which they are with difficulty removed.

Verbesina Virginica, Linn. Grows along fences; collected in St. John's; Richland district. Fl. July.

Griffith, Med. Bot. 380. The root, in decoction, is said to be a powerful sudorific.

Ambrosia artemisiæfolia, W Rag-weed. Grows in cultivated lands and pastures; collected in St. John's, Charleston district.

Mér. and de L. Dict. de M. Méd. i, 227. The plant is used in fevers in Maryland as a substitute for quinine; a

tincture is made, or the juice given with whiskey. It is very bitter, and is thought to be useful.

Ambrosia trifida, Linn.

Griffith, Med. Bot. 387 A plant has been noticed by Dr. Robertson (Am. Journal Med. Sci. xii, 382, new series), which appears to be this, which is highly beneficial in arresting excessive salivation.

Eclipta erecta, Linn. T. and Gray. } Collected in St.
" *procumbens*, Ell. Sk. } John's; dry soils; vicinity of Charleston. Fl. July.

Griffith, Med. Bot. 387 It is said to stain the hair black.

Helianthus tuberosus. Artichoke. Cultivated in South Carolina.

Mér. and de L. Dict. de M. Méd. Supplem. 1846, p. 351. The root washed in water, and given to animals, will, it is said, produce meteorism ("météorizations mortelles"). Nouv. Biblioth. Méd. viii, 426.

In Patent Office Reports, p. 578, 1848, a paper on the culture of the *Jerusalem artichoke*, translated from the French, is published. This contains a full description of its various uses as an article of food, etc. I will enumerate some of them:

The tubers are regarded in Alsatia, and near Strasburg, as an excellent nutriment for milch cows; equally good as food for horses, which are thus kept in a good condition, and sustain hard labor. With the addition of salt, they are also useful in feeding sheep. The tubers compare very well with the potato in the amount of dry matter they contain, and its relative value as a root-plant used for fodder is maintained. The "stalks are of nearly as great use as the tubers; and here is the advantage which it has over the potato." Even if the stalk is cut early in September, which diminishes the size of the tubers, it is compensated for by the supply of green food at that early period. According to Schwertz's experiments, one hundred kilogrammes of

the green stalks equal, as regards nutritious qualities, 31.250 kilogrammes of our hay. The stalks of the artichoke can be employed even should they be allowed to remain till the tubers are ripe, when they are readily eaten by all domestic animals. "Finally, the stalks of artichokes have for *fuel* a value which no other product of field culture has. To prepare them for use they are cut in two, and made up into fagots. This fuel is especially adapted for heating ovens or furnaces."

It bears a great amount of cold. It can be left in the ground all winter, and does not easily suffer from heat. It is well adapted even to dry and poor soils. The article which I condense contains full information as to the best mode of planting, gathering, etc. "Kade, an Alsatian, saw the same soil produce every year for thirty years a tolerable crop of stalks and tubers of this plant, though it had not for a long time received either culture or manure." Early in April is the best time to plant, but even in winter they can be put in the ground. Withered tubers may be used as seed if soaked; but planting of pieces or cuttings has not the same success as with the potato. Unless the season is too moist the tubers may be left in the ground all winter. To preserve them when gathered "it is sufficient to make a heap and cover them with earth, for they are not affected by cold unless when exposed to the open air. The stalks intended to serve as fodder in place of hay are cut with a sickle, and carefully dried by leaning them up in heaps." M. Vilmerne, of the Agricultural Society of Lyons, remarks that the artichoke was known as an esculent plant by the Romans, but neglected in the dark ages, till it again came into notice in the sixteenth century. Almost all parts of this plant, he says, may be rendered useful. The leaves yield an extract which may be substituted for quinine. The leaves themselves may be cooked and eaten after the fruit is gathered, or used as fodder mixed with certain grasses. They may be substituted for hops in making beer, and they contain a great proportion of potash.

The Jerusalem artichoke contains a very large propor-

tion of starch. It is used for making pickles, and eaten as a vegetable. It is easily cultivated, gives less trouble than almost any other plant, reproduces with scarcely any attention, and is a most valuable food for cattle, hogs, etc. See Ure's Dictionary of Arts, Manufactures, etc.; Thaër's Science of Agriculture.

Among our best plants which may be cultivated for starch may be mentioned the potato, wheat, rice, arrow-root (*Maranta arundinacea*), corn, etc. For methods, see Ure, and domestic receipt books.

Helianthus annuus. Sunflower. Cult.

Evaporation takes place in plants to an inconceivable degree under certain circumstances. It is known by the experiments of Dr. Hales that a sunflower plant will lose as much as one pound fourteen ounces by perspiration in twelve hours. "Taking all things into account, a sunflower perspires seventeen times more than a man."

The French make a moxa out of the pith of the sunflower. The English use for this purpose cotton dipped in a solution of saltpetre.

A few years since Commander Maury recommended the sunflower to be planted around exposed residences, as a barrier against malaria.

The seeds are used for fattening poultry, as they are highly nutritous. One hundred pounds of the seed of the sunflower are said to yield forty pounds of oil. The refuse after expression furnishes excellent food for cattle. "From the leaves of the plant cigars are manufactured, of singular pectoral qualities. The stalk affords a superior alkali." (Mrs. Ellsworth.)

The following I extract from the Farmer's Encyclopædia:

"An acre of land will contain twenty-five thousand sunflower plants, twelve inches distant from each other. The produce will be according to the nature of the soil and mode of cultivation; but the average has been found to be fifty bushels of the seed per acre, which will yield fifty gallons of oil. The oil is excellent for table use, burning

in lamps, and for the manufacture of soaps. The marc, or refuse of the seeds after the oil has been expressed, made into cake, will produce fifteen hundred pounds, and the stalks when burnt for alkali will give ten per cent. of potassa. The green leaves of the sunflower when dried and burnt to powder make excellent fodder for milch cows, mixed with bran. From the ease with which sunflowers are produced in gardens (for they seem to flourish in any soil, and to require no particular care), we may safely say that an acre of land will yield a considerable return. Poultry are very fond of the seeds."

The following appeared in the "Atlanta Commonwealth," 1862:

"*Sunflower seed and ground-nut oil.*—The fact has been known for some time that the crop of linseed oil was short, and that there would, in consequence, be a great scarcity of linseed oil. Very naturally those interested began to look around for a substitute, and the oils of cotton seed, sunflowers, and pea-nuts have been favorably mentioned. How far either will serve as a substitute we do not know; but certainly the oil extracted from some one or all of them might subserve some useful end.

"We recollect that some years ago the cultivation of the sunflower was strongly urged in an agricultural periodical for various useful purposes; first, for a bee pasture; secondly, the seeds were good for poultry, or the manufacture of oil; and then, after the oil was expressed, to be compressed into oil-cake for cow-food and fattening hogs; the leaves for fodder and the stalk for wrapping paper. In the present condition of the country, these suggestions may not be without value.

"The manufacture of oil from cotton seed, we believe, has been carried on for some time in New Orleans, and expressed seed made into oil-cake for cow-food. We see no reason why this oil should not be made in any desirable quantity and with great profit, as well as serve most of the purposes for which oil is used."

Anthemis. See Maruta.

Maruta cotula, D. C., T. and G. } Wild chamomile;
Anthemis, Ell. Sk. } May-weed. Grows in dry soils; collected in St. John's, Berkley; vicinity of Charleston; Newbern. Fl. July.

Bergii, Mat. Med. i, 741; Mér. and de L. Dict. de M. Méd. i, 741; Ed. and Vav. Mat. Méd. 263; U. S. Disp. 278; Shec. Flora Carol. 171; Griffith, Med. Bot. 398. A tonic, diaphoretic, and emetic; resembling chamomile in its effects, to which it is fully equal, but more nauseous. It is one of our most useful domestic remedies, and is given in numerous diseases. It is also possessed of some power as an antispasmodic. A decoction acts as a sudorific and anodyne, and is given in colds and hysterical attacks. Mérat mentions it as a substitute for assafœtida, that it is employed as an antihysteric, and is recommended in rebellious bilious fever. Dr. Ashby speaks of it as a prompt and powerful vesicant when bruised and applied to the surface as a poultice. Barton and Rafinesque had conveyed a different impression concerning it. Dr. Ashby adds that unlike blisters caused by other vegetable irritants, the vesications readily heal. Journal Phil. Coll. Pharm. Every part of the plant is fetid and acrid, has minute resinous dots upon its surface, and when much handled blisters the skin. Rural Cyc. The flowers of the medicinal chamomile are powerfully antiseptic — one hundred and twenty times superior to salt.

Achillea millefolium, L. Milfoil; yarrow. Grows in damp, rich soils; collected in St. John's, Berkley; vicinity of Charleston; Newbern. Fl. July.

U. S. Disp. 1225, Appendix; Le Mat. Med. ii, 108; Ed. and Vav. Mat. Méd. 267; Bergii, Mat. Med. 738; Hoffmann, "De Præstantia Remed. Domest.;" Matson's Veg. Pract. 299; Mér. and de L. Dict. de Mat. Méd. i, 22; Shec. Flora Carol. 91; Lind. Nat. Syst. Bot. 253; Woodv. Med. Bot. 180. This is an astringent; employed in the suppression of hemorrhages. The Highlanders made an ointment of it to dry up wounds. Linnæus informs us

that the inhabitants of Delecarnia mix it with ale in place of hops, and think it imparts to the liquor an intoxicating quality. Lightfoot's Flora Scotica, 486; Thornton's Fam. Herb. A tablespoonful of the expressed juice will arrest spitting of blood; and it is also valuable as an astringent in dysentery. Dr. Buckwald says he experienced great benefit from the plant in the bleeding piles. Stahl boasted of it as a specific; and the great Haller asserts that the infusion, taken inwardly, with the outward application of the leaves, cut fine, will dissipate dreadful wounds—cicatrizing them rapidly. Stahl, Diss. de Thérap.; Hoffman, "De Præstant. Remed." 18; Linnæus, Flora Shec. 299. Besides the astringent, it possesses a mild, antispasmodic, tonic power, which renders it beneficial in hysterical affections and in leucorrhœa. The flowers are stronger than the leaves, being somewhat similar to chamomile, and yielding by distillation a small quantity of essential oil of a blue color. Dr. Grew says it resembles contrayerva in its effects. Mér. and de L. Dict. de M. Méd. Supplem. 1846, p. 5. See Analysis in Bull. des Sci. Méd. de Férus, xxii, 119, and xxvi, 253; Soc. de Méd. Botanique de Londres, 1830. It is asserted that this plant has a marked tonic power upon the bladder; it is employed in debility of that organ, and is especially useful in correcting the involuntary discharge of urine in children. A handful of the leaves is infused in a pint of boiling water, and three ounces may be taken by an adult three times a day. See Culverwell's treatment. This plant might be found of great service by practitioners residing in the country. The leaves of yarrow, or milfoil, are said by Johnson, in his Chemistry of Common Life, to "have the property of producing intoxication. These are also used in the north of Sweden by the Delecarnians to give headiness to their beer."

Tanacetum vulgare, L. Tansy. Sparingly nat. in North Carolina. Chap.

Plant emits a strong but not unpleasant odor, and has a

bitter taste; said to possess tonic, cordial, and anthelmintic properties. Rural Cyc. See, also, medical authors. Plant yields an oil, and is culinary and medicinal.

Leucanthemum vulgare, Lam. and T. and G. } Ox-eyed
Chrysanthemum leucanthemum, L. } daisy; white
weed. Natural in upper districts; collected in St. John's Charleston district; vicinity of Charleston. Fl. July.

Shec. Flora Carol. 394; Mér. and de L. Dict. de M. Méd. ii, 271; Nouv. Journal de Méd. v, 208; Griffith, Med. Bot. 387 It is vulnerary and detergent. Dém. Élém. de Bot. iii, 212. In Siberia, according to Dr. Rehmann, they employ the plant in leucorrhœa. It is not used in this country. Nouv. Journal de Méd. v, 208. Contraine states that it is a certain safeguard against fleas, destroying, or driving them off in a short time. Bull. Acad. Brux. viii, 234.

Antennaria margaritacea, R. B. T. and G. } Cat-weed;
Gnaphalium margaritaceum, L. Ell. Sk. } life-everlast-
ing. Grows among the mountains of South Carolina; vicinity of Charleston, Bach. Fl. Sept.

U. S. Disp. 1258. It is employed in popular practice in diseases of the chest and bowels, and is externally applied as a fomentation to wounds and bruises. Schœpf says it possesses anodyne properties.

Gnaphalium polycephalum, Mx. Cat-foot. Diffused in upper and lower country. Grows in pastures; collected in St. John's; vicinity of Charleston; Newbern. Fl. August.

U. S. Disp. 1258; Matson's Veg. Pract. 275. "It probably possesses little medicinal virtue." A popular remedy in hemorrhagic affections, and as a fomentation in bruises and languid tumors. The infusion is employed by the vegetable practitioners in fever, influenza, fluor albus, and consumption. Acting probably as a warm sudorific. It has a pleasant, aromatic, and slightly bitter taste when dry.

Arnica nudicaulis, Ell. Grows in damp, pine barrens; vicinity of Charleston, Bach; St. John's, S. C.; Florida; Richland, Gibbes.

Griffith, Med. Bot. 409. It is supposed that this may be used as a substitute for the European species, the *A. montana*, which is well known as a powerful plant, possessing stimulant properties; directed with peculiar energy to the brain and nervous system. It also produces an emetic and cathartic effect, and is much used by the Germans in paralysis, amaurosis, and other nervous diseases.

Senecio aureus, Ell. Sk. Ragwort. Mountains of South Carolina. Fl. July.

U. S. Disp. 1295. It is said by Schœpf to have been a favorite vulnerary with the Indians; the juice of the plant in honey, or the seeds in substance, are employed.

Cnicus benedictus, T. and G. }
Centaurea benedicta, L. } Nat. along the sea-coast, near Beaufort; collected in St. John's; vicinity of Charleston. Fl. August.

Trous. et Pid. Traité de Thérap. etc., i, 253; Pe. Mat. Med. ii, 408; Ed. and Vav. Mat. Méd. 179; U. S. Disp. 196; Le. Mat. Med. i, 202; Woodv. Med. Bot. 34, i, 14; Ann. de Thérap. 1843, 206; Bergii, Mat. Méd. i, 747; Mér. and de L. Dict. de M. Méd. ii, 171; Thompson's Steam Pract.

The plant is emetic, tonic, and febrifugal; one drachm of the powder of the flowers in wine, with a decoction of the leaves, is said to be invaluable in anorexia, weak stomach, impaired by irregularities of diet, atony, jaundice, and tertian fevers; Thorn. Fam. Herbal, 725; Dém. Élém. de Bot. iii, 115. It is used, also, in chronic diarrhœa and in gout. Woodv. *loc. cit.* A decoction "possesses marked tonic properties;" a large dose acting as an emetic, and occasioning a plentiful discharge from the cutaneous surface. It is employed as a febrifuge in dyspepsia, pleurisy, and chronic peripneumony. Woodville says the extract is strongly recommended in the catarrh of children; the seeds are very bitter, and may be used with the same intention as the leaves. Rectified spirits extract the virtues of the plant. The watery extract appears, also, to possess the emetic prin-

ciple. By keeping, a salt is produced upon the surface resembling nitre. See Hist. des Sc. de Berlin, 79; and Duncan's Edinb. New Dispensatory.

Cynara scolymus. Jerusalem artichoke. Ex. Cult.

I call attention to this plant, as it grows luxuriantly in the Confederate States.

Mér. and de L. Dict. de M. Méd. Supplem. 1846, 234. "Dr. Montaine, of Lyons, assures us," remarks Mérat, "that each year he treats with success a large number of fever patients with the extract of the leaves in the form of pills." Great use is made of it on the plantations in this state as a tonic and diuretic in dropsy; the leaves are steeped in rum, of which a wineglassful is administered three times a day; among the negroes I have frequently seen it prescribed with advantage in this way. It is employed also in jaundice, the expressed juice or the infusion being used; of the former two or three spoonfuls may be given; large doses purge. We also use the corollas for curdling milk. The modern Arabians consider the root aperient, and class the gum among their emetics. Lind. Nat. Syst. Bot. 284; Ainslie, Mat. Med. Ind. i, 22. Dr. Copeman, pharmaceutist to the hospital at Norfolk, makes a favorable report on the value of the leaves in the form of tincture and extract, in rheumatism. See London Med. Gazette, 1833, from extracts in Gazette Méd. de Paris, 13th April, 1833. Dr. Barry first employed the leaves in chronic jaundice, and Perroton, of Lyons, also administered it frequently in the same disease. Revue Méd., Nov. 1845.

Taraxacum dens-leonis, Desf., T. and Gray. } Dandelion.
Leontodon taraxacum, Ell. Sk. } Collected in St. John's, Berkley; I have observed it growing in the streets of Charleston and New York; Newbern.

Watson's Pract. Physic, 39; Ed. and Vav. Mat. Méd. 184; Wilson Philip, Diss. Abdom. Viscera; Bell's Pract. Dict. M. M. 445; Royle, Mat. Med. 453; Pe. Mat. Med. ii, 401; U. S. Disp. 706; Le. Mat. Med. i, 396; Brande, Dict.

Mat. Med. and Pharm. v, 632; Woodv. Med. Bot. 39, t. 16; De Cand. Prodromus, vii, 45; Ball. Gar. M. M. 319; Bergii, Mat. Med. ii, 687; Mér. and de L. Dict. de Mat. Méd. iv, 87; English Physician, by Nich. Culpepper, gent., "Student in Physic and Astrology," p. 109.

The root is deobstruent, cathartic, and diuretic. "Good in obstructions of the viscera, scirrhosities of the liver, stone in the gall-bladder, ascites, jaundice, etc." A decoction of the root is also useful in impetigo and itch; the doses are one drachm of the juice and two ounces of the decoction. Thornton's Fam. Herbal, 677; Dém. Élém. de Botanique, iii, 169. At Gottingen the roots are washed and substituted for coffee by the poorer inhabitants; they say the difference between this and the imported article can scarcely be distinguished. Murray's Apparat. Méd. Withering mentions that when a swarm of locusts destroyed vegetation on the Isle of Minorca the inhabitants subsisted on this plant. The great Boerhaave entertained a favorable opinion of it; and Bergius found it useful in derangement of the biliary apparatus from gall-stones, etc. Mat. Medica. Delius, de taraxaco præsertim aquæ, etc. Dr. Mendelstaed cured black jaundice (l'ictère noir) with it. Van Swieten, in his Comment., Zimmermann, and Störck spoke of it in jaundice and hypochondriacal affections. Later writers have confirmed these opinions expressed by those living at an earlier period. Dr. Wood, in the U. S. Disp., says that his experience in derangements of the biliary secretions has been decidedly in its favor, it being particularly valuable in chronic hepatitis. Eberle recommends it in chronic cases of infantile jaundice: "Diseases of Children." Griffith, in his Med. Bot. 415, alludes to its use in deranged conditions of the digestive organs, connected with an abnormal state of the liver, and in dropsical effusions arising from the same cause. In habitual costiveness, dependent on a want of due biliary secretion, it acts with peculiar benefit; and, as an adjuvant to more active remedies, where the liver is indurated, it has been prescribed with advantage. It has been employed, likewise, in affections of the spleen, uterine obstructions,

chronic cutaneous disorders, etc. When its diuretic effect is desired, it is advised that it be given in combination with supertartrate of potash. This plant is supposed to be possessed of valuable properties as an alterative, and much use is made of it among patients of a strumous diathesis, and those affected with diseases of the skin. I have seen it employed to some extent in New York for these purposes, constituting an important ingredient of diet drinks. It may be easily obtained, and might be found of much service to practitioners residing in the country. The young shoots are eaten as salad. It has been observed that the flowers possess a certain degree of sensibility; for when under the influence of the direct rays of the sun on a summer morning an evident motion of the filaments is perceptible. See MSS. Lect. of Dr. Hope. The plant should be gathered in the summer and early in the autumn. An analysis of it is found to contain gum, gluten, albumen, an odorous principle, extractive, *caoutchouc*, a peculiar bitter crystallizable principle, some salts, etc. The decoction made with two ounces of the root of a whole plant to two pints of water, boiled to one-half, may be given in doses of a wineglassful; of the extract, the dose is ten grains to a half-drachm; the latter should be of a brown color, and entirely soluble in water.

The young shoots are edible, and produce in children a diuretic effect. The leaves and roots of this plant are bitter, and contain a bitter milky juice. I have given the extract largely during five years attendance at the Marine Hospital, Charleston; and I ascertain that the extract certainly produces a laxative effect given in from ten to thirty grains—the same, or a much larger quantity, dissolved in water, proved diuretic. In this way I account for the different qualities ascribed to it. There was always a tendency to ascribe a power in the dandelion to act upon the portal system. "The roots of the plant were esteemed to be diuretic, saponaceous, and resolvent, and to be powerful remedies for removing obstructions of the liver, and of the other viscera." Their purified, expressed juice has been

given, from two to six ounces, twice, thrice, or oftener in the day; and infusions and decoctions of the herb and root have been used for the same purpose. Boerhaave had such a great opinion of the continued use of the juice, or of the infusions of the plant, that he believed they were capable of removing most obstructions of the viscera that were to relieved by medicines. Bergius, likewise, as was stated, speaks much in the praise of this simple, and says "that he has often seen it prove of service after other remedies had failed; and that he had seen hardness of the liver removed by patients eating daily, for some months, of a broth made with dandelion root, the leaves of sorrel and the yolk of an egg with water, while they took at the same time cream of tartar to keep their bodies open;" and he adds "that he has seen a similar course of service in the ascites, and in cases of gall-stones." (Thornton's Herbal, 677.) The yolk and yellow of eggs undoubtedly produces a laxative effect; so does the dandelion in the fresh state, or in the form of the extract. It is a useful vegetable laxative in place of calomel. I have seen a physician in Charleston send to the North for the fresh plant while it grew abundantly at his own door. Leontodon contains *caoutchouc.*

Cichorium intybus.—Wild endive; chiccory. Introduced. As this plant is cultivated to some extent in the Confederate States, and will probably be largely required in the future, I insert the following, which I find in Dickens' "Household Words."

Chiccory is in truth, however, one of the most harmless substances that ever have been used for the purpose of the adulteration of coffee, not excepting even water—as it is obtained in London. In the case of all low-priced coffee—of all coffee purchased by the poor—adulteration with chiccory yields profit to the grocer simply because it yields pleasure to the customer. Good chiccory and middling coffee dexterously mixed can be sold at the price of bad coffee, and will make a beverage at least twice as good, and possibly more, certainly not less wholesome. Coffee that chic-

cory would spoil is bought by none of the poor, and by a portion only of the middle classes. We do not advocate secret adulteration, but we would have the adulteration to be made open, and all people to understand distinctly that since chiccory is altogether wholesome it is a matter that depends upon the taste and the pocket whether they will buy coffee pure or mixed. Take away all fraud from the use of chiccory, and we shall be glad to see its use fairly promoted. Let us look a little more closely into the subject.

Chiccory is better known to many of us when growing wild in many parts of England on dry, chalky soils under the name of the wild endive; it belongs to a tribe of composite plants called "the Cichoraceæ," in which are included, also, dandelion and the garden lettuce. It shoots above the soil a tuft of leaves, and when it runs to flower, sends up a stem from one to three feet high, rigid, rough, branched, clothed with leaves and blue flowers. It has a long root like that of a carrot, which becomes enlarged by proper cultivation, and is the part used for the manufacture of a substitute for coffee. Every part of the plant is perfectly wholesome—the root when fresh is tonic, and in large doses slightly aperient. Chiccory is cultivated extensively in Belgium, Holland, and Germany. It is cultivated in France for its leaves, as herbage and pasturage; in Germany and Flanders for its roots. It was first cultivated in England about 1780 by the well-known agriculturist, Arthur Young. It is a most valuable article of farm produce. On blowing poor and sandy land it yields more sheep food than any plant in cultivation; it will thrive on fen, and bog, and peat; it is good fodder for cattle; it is good for pigs. It grows only too readily, if that be an objection, for if not carefully extirpated, it is apt to become a vivacious weed. For herbage chiccory is sown precisely in the same way as clover; for the roots it is sown and thinned in the same way as carrots, and taken up, as carrots are, in the first autumn after sowing.

The great demand for chiccory has led to its very exten-

sive cultivation in this country; considerable sums of money have been expended on the kilns and machinery required to prepare it for the markets, and a large amount of capital is at the present time profitably employed upon this new branch of English agriculture. It is not unimportant to notice that the cultivation of chiccory requires and remunerates the use of lands worth from five pounds to eight pounds per acre; that so far from exhausting the soil, wheat may be grown upon it after chiccory with the greatest advantage; that it furnishes occupation for a very large number of laborers, including women and children, and at a time of year when the fields afford but little other employment; and that, consequently, in some parishes, the poor's rate has been diminished by one-half since chiccory was introduced.

The blanched leaves of chiccory are sometimes used as a substitute for endive, and are commonly sold as an early salad in the Netherlands. If the roots, after being taken up, be packed in sand, in a dark cellar, with their crowns exposed, they will push out shoots, and provide through the winter a very delicate blanched salad, known in France as *Barbe de Capucin*. When chiccory is to be used for coffee the roots taken up by the grower are partly dried, and then sold to the manufacturer, by whom they are cut into slices, roasted, and ground. The ground chiccory thus made is used by many poor upon the Continent as a substitute for coffee by itself. It has not, of course, the true coffee flavor, but it makes a rich and wholesome vegetable infusion of a dark color, with a bitterish sweet taste, which would probably be preferred by a rude palate to the comparatively thin and weak, and at the same time not very palatable infusion of pure coffee of the second or third quality.

By the combination of a little chiccory with coffee the flavor of the coffee is not destroyed, but there is added to the infusion a richness of flavor, and a depth of color—a body, which renders it to very many people much more welcome as a beverage. The cheapness of chiccory enables a grocer, by the combination of chiccory powder with good coffee, to sell a compound which will yield a cup of infi-

nitely better stuff than any pure coffee that can be had at the same price. Any one with a sensitive taste, and a sufficient purse, would of course buy coffee of the finest quality, and never think of bettering with chiccory the enjoyment of its delicate aroma. The majority of the people, however, are by no means in this position. Coffee, with an admixture of genuine chiccory (which we take care to procure by purchasing the article in its raw state, and having it roasted the same as coffee), was preferred to coffee in its pure state. The reason of this we can clearly understand, and will explicitly state. We can afford to sell, and do sell a finer coffee when mixed with chiccory than we can sell in its pure state at the same price; and the superiority of the coffee in conjunction with the fulness of the chiccory, in our opinion, decidedly gives greater satisfaction to the public.

It is, however, a rule that will bear harshly on the comforts of the poor if coffee is to be sold only in its pure state, and chiccory cannot be obtained in any less quantity than a two-ounce packet. Two ounces of chiccory would go in mixture to about a pound of coffee, and there are thousands who buy coffee itself by ounces. Moreover, the chiccory coffee sold by the grocer is made with coffee of a higher price and better quality than the poor man would dare to give for coffee bought pure, when he has to make another outlay upon chiccory for mixing. The necessity of two purchases would suggest the idea of greater cost, lead to a desire for more economy; so in the buying the poor man would be a loser. Certainly, also, he would lose by having to make at home, in his own clumsy way, the mixture which it had been before the interest of the grocer so to proportion that he might bring custom to his shop by issuing an article as good and palatable as any that could be contrived by his competing neighbors.

"Of all the plants," says Thaër, in his Principles of Agriculture, "which have been proposed as substitutes for coffee, and which when roasted and steeped in boiling water yield an infusion resembling coffee, chiccory is the only one which has maintained its ground. It has been used in this

manner for thirty years, even when the price of coffee has been low; and has always yielded considerable profits, both to manufacturers who prepare it in large quantities and those who cultivate it in their neighborhood. It has also been cultivated as a fodder-plant, and highly recommended by Arthur Young in England. A plentiful supply of fodder is obtained without injury to the roots." See Thaër for method of cultivation, etc.

In Patent Office Reports, 1854, p. 348, is a briet notice of the mode of cultivating chiccory. A variety which the French call *Chicorée sauvage à café*, has long fleshy roots like the white carrot, which are used for making coffee. "In the Middle and Southern states the roots may remain in the ground during winter without injury from frost."

Among the substitutes for coffee employed in the Confederate States during its great scarcity, I may mention rye, raw yam potato, cut into small fragments, roasted and parched, okra seed, and corn flour parched and ground, cotton seed, the ground-nut, Bené, etc., which have all been tried.

Lactuca elongata, Muhl. } Wild lettuce. Damp soils;
" *longifolia*, Mx. } collected in Charleston district; Newbern. Fl. June.

U. S. Disp. 421; Ann. de Thérap. Ann. 1843; Woodv. Med. Bot. 75–31; see *L. virosa*, Mér. and de L. Dict. de M. Méd. iv, 10.

It is said to act as an anodyne, and to produce discharge by the kidneys and skin, being similar in its effects to the *L. virosa* of Europe; according to others, it is destitute of narcotic power; see M. Aubergier's experiments.

Nabalus fraseri, D. C. and T. and G. } Gall of the earth.
Prenanthes alba, Ell. Sk. } Grows in damp pine lands; collected in St. John's; Richland; vicinity of Charleston; Newbern.

The root is excessively bitter; it is used in domestic practice in this state as a tonic. I would invite further examination.

Sonchus oleraceus, L. Common sow-thistle. Diffused; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 439. It is said to be useful in stagnation of the portal circulation; according to some, it increases the secretion of milk. Fl. Scotica, 428; Dém. Élém. de Bot. iii, 177. The tender leaves are boiled and eaten in some countries as greens; they are of a cooling nature, are applied outwardly as an emollient cataplasm, and are found serviceable in inflammatory swellings, carbuncle, etc. The flowers open at 6, A. M., and close at 12, M. The roots are milky and bitter, but have occasionally been converted into bread. Rural Cyc.

PLANTAGINACEÆ. (*The Rib-grass Tribe.*)

The herbage slightly bitter and astringent.

Ptantago major. Plantain. Nat. Collected in St. John's, Berkley, near the Santee river; I have also observed it in the streets of Charleston; Richland district; Newbern. Fl. June.

Bergii, Mat. Med. i, 71; Le. Mat. Med. ii, 232; U. S. Disp. 1289, App.; Ed. and Vav. Mat. Méd. 135; Mér. and de L. Dict. de M. Méd. v, 358; Journal Univ. des Sc. Méd. xix, 127

The leaves, when chewed, tinge the saliva red. This plant was a popular vulnerary and astringent once in great repute. It was also highly valued for its efficacy in fevers. Bergius, however, tested it with unfavorable results. We are informed that "the seeds in milk will stop a dysentery." Boerhaave states, from his own experience, that the fresh leaves applied to the feet will ease the pain and fatigue occasioned by walking, and that the whole plant was esteemed useful in healing and consolidating ulcers and recent wounds, and as a dressing for blisters and sores. The leaves no doubt make a soothing application to inflamed surfaces. A decoction of the leaves in milk was employed as a gargle in inflammation of the fauces, and a collyrium was made with a decoction of the seeds. Thornton's Fam. Herb.;

Woodv. Med. Bot.; Dém. Élém. de Bot. 85; Milne, Ind. Bot. 102. It was looked upon as a panacea by the ancients; see Pliny, l. 26, c. 11; Celsus, lib. iii, c. 22; Scultz, Mat. Med. i, 112; Boyle de Util. Phil. Nat. ii, 150; Petzolat, Eph. Nat. cur. cent. vii, Obs. x, 25. It was formerly carried as an amulet. "En fin," remarks Mérat, "on a porté la racine des plantains en amulet pour guérir ou prévenir une multitude des maladies." See the Dict. de M. Méd. Supplem. 1846, 567; Rev. Méd. Juin, 1837, 399. Dr. Perret communicated to the Soc. des Sc. Méd. de Lausanne a report on the beneficial effects derived from the root in various maladies: Journal Univ. des Sc. Méd. xix, 127; and Desbois says he has seen the good effect resulting from the use of the leaves in scrofulous ulcers and in indolent tumors. Mat. Med. ii, 254. The authors of the U. S. Disp., however, refer to it as a plant of feeble power, allowing it to be refrigerant, diuretic, deobstruent, and somewhat astringent. A chemical analysis would be desirable, as it is probable that a narcotic principle exists in it.

Plantago lanceolata, Ph. Ribwort; snake plantain. Grows around Charleston and Savannah; collected in damp meadows in St. John's, Berkley; Newbern. Fl. July.

Fl. Scotica, ii, 1089. It possesses properties very similar to the above. The Highlanders attribute great virtue to the leaves as an ointment for healing up fresh wounds.

PLUMBAGINACEÆ. (*The Leadwort Tribe.*)

This order embraces plants possessed of very opposite qualities; part are tonic and astringent, and part acrid and caustic in the highest degree.

Statice limonium, Torrey.
" *Caroliniana*, Walt. Fl. Carol. } Marsh rosemary. Grows on the seashore. Fl. Sept.

U. S. Disp. 680; Big. Am. Med. Bot. 251; Coxe, Am. Disp. 568. This is one of our "most intense and powerful astringents;" much used in New England for all the pur-

poses to which catechu and kino are applied. A large dose acts as an emetic, and in smaller quantities as a powerful expectorant; it also possesses considerable antiseptic power. Its chief popular application is to aphthous and ulcerative affections of the mouth and fauces. Dr. Balies, of Massachusetts, found it highly serviceable in cynanche maligna: he used a decoction of the roots both internally and locally, and these beneficial results have been corroborated by others. It is also given with advantage in S. anginosa, and in aphthous fever attendant on dysentery, where bark is inadmissible. From the experiments of Prof. V Mott, in an inaugural thesis spoken favorably of by Dr. Bigelow, it proved serviceable in chronic dysentery after the inflammatory symptoms had subsided. From his observations, as well as from those of Dr. Edward Parrish, the cold infusion was the best form. Dr. P found it to contain twelve per cent. of tannin, also gum, extract, alkali, etc., but no gallic acid. Am. Journal Pharm. xiv, 116; Griffith, Med. Bot. 525; Am. Journal by John Stearnes, 281; see *S. limonium;* Mér. and de L. Dict. de M. Méd. vi, 524. It was regarded as an astringent in the time of Pliny; lib. xxvi, 28. The root is employed in infusion, decoction, or tincture. Alcohol is a better solvent of the properties of the root than water. The infusion with cold water is preferable to that with hot.

EHRETIACEÆ.

Heliotropium Indicum. Turnsole. Michaux found it at the Eutaw battle-ground, St. John's, Berkley; and Mr. Oemler in the Dutch Fork, in Richland district. Fl. July.

Ell. Bot.; Mér. and de L. Dict. de M. Méd. iii, 462. It has been employed in the cure of headache. See Walkenaer, "Voyage," xii, 469. It is used in Guinea and in India. The juice is applied to eruptive surfaces, opthalmias, etc. Ainslie, Mat. Med. Ind. ii, 414. Rottboll, after Sprengel, says it is a vulnerary, employed in some countries to arrest flooding. Hist. de la Med. iv, 467; Abbet, Guyane, i, 117.

BORAGINACEÆ. (*The Borage Tribe.*)

Characterized by soft, mucilaginous, and emollient properties. Some are said to contain nitre, a proof of which is shown by their frequent decrepitation when thrown on the fire. Lindley.

Lithospermum arvense, L. Bastard alkanet. Introduced. Waste places, Florida, and northward.

Wilson states that the red bark of the root stains paper, linen, oily substances, and the human skin; and that it is sometimes used as a rustic substitute for rouge, and as a coloring matter of ointments. Rural Cyc.

Cynoglossum amplexicaule, Mx. } Hound's tongue. Wild
" *Virginicum*, L. } comfrey. Grows in shady spots; Richland and Charleston districts. Fl. June.

The root is mucilaginous, and much employed in domestic practice for complaints of the lungs, and externally for poultices in sprains, bruises, etc. Farmer's Encyc.

Shec. Flora Carol. 489. According to Clayton, the root is astringent, and is administered in diarrhœa. The leaves intoxicate when smoked as tobacco. According to Griffith, it is stated that the root may be used as a substitute for comfrey. Med. Bot. 500.

Cynoglossum officinale, L. Introduced. Waste grounds, North Carolina, and northward. Chapman.

The leaves, when touched, emit a pungent and disagreeable odor, like that of mice in a trap. The plant is eaten by goats, but is disliked by all other domestic animals. Its roots have astringent and narcotic properties—regarded as antiscorbutic. Wilson's Rural Cyc.

LAMIACEÆ OR LABIATÆ. (*The Mint Tribe.*)

These do not contain a single unwholesome or even suspicious species; their tonic, cordial, and stomachic qualities are due, according to Lindley, to the presence of an aromatic, volatile oil, and a bitter principle.

Mentha tenuis. American spearmint. Cult.

It is an antispasmodic, and is said by Culpepper to be also an aphrodisiac. English Physician, by Nich. Culpepper, gent., "Student of Physic and Astrology," p. 214. It is considered by the steam and vegetable practitioners a specific in allaying nausea and vomiting. Thompson's Practice, and Matson's Veg. Pract. 286.

Melissa officinalis. Balm. Introduced.

The balm, sage, mint, and other aromatic plants, for the most part cultivated in our gardens, need scarcely more than a reference. The melissa is cultivated for bees. The reader is referred to an article on "Secretion in plants," in Wilson's Cyc., showing the deposits of aromatic and other properties at the base of plants, with the theories of De Candolle, Macaire, and others.

Mentha piperita, L. Peppermint. Introduced.

We have also the round-leaved mint (*M. rotundifolia*)—introduced.

They abound in resinous dots, which contain an essential oil. The pleasant, aromatic, antispasmodic properties of these labiate plants are well known. They flourish within the Confederate States, and the essence and mint water can be extracted in any quantity. In Patent Office Reports, 1854, the mode of culture of a number of medicinal herbs is described, particularly the aromatic plants, viz: sage, mint, rosemary, mustard, etc., pp. 367 to 380. Nearly all the native and introduced plants containing aromatic oils can be raised at the South in sufficient quantities to supply all demands. An establishment such as that at New Lebanon, New York, and at other localities, for the cultivation of medicinal and useful plants on an extensive scale, should now receive consideration. See my paper in De Bow's Review, August, 1861.

Lycopus Europeus, Eat. M.
" *angustifolius*, and
" *sinuatus*, Ell. Sk.
Water horehound. Nat. in damp soils; collected in St. John's; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, 25; U. S. Disp. 437; Mér. and de L. Dict. de M. Méd. ii, 168; Matson's Veg. Pract. 250; Milne, Ind. Bot. 34. This is reputed to give an indelible stain to whatever it touches. Hoffmann says the gypsies use it to disguise themselves. It has been highly spoken of on the Continent of Europe in intermittent fevers; Prof. Re, of Turin, declares that in doses of two drachms of the dried plant the most obstinate intermittents were removed. Broffiero says it is astringent. See letter (in French) on the properties of *L. Europeus* in allaying fever. Dr. Broffiero's note in the Repertorio Medico Chirurg. 832, and Griffith's Med. Bot. 505. It is employed by the vegetable practitioners in diarrhœa, atonic conditions of the digestive organs, and as a cleansing wash for sores. I would invite attention to this and the following, which are easily obtained.

Lycopus Virginicus, Mich. Bugle-weed; Virginian lycopus. Diffused; collected in St. John's, Berkley; vicinity of Charleston; Richland district. Fl. August.

Mér. and de L. Dict. de M. Méd. ii, 168. It has been administered internally with great success in hemorrhage and hæmoptysis; and in phthisis it lessens the force of the circulation. In the diseases first mentioned Dr. Silliman verifies the results obtained by Linstey—twenty persons having tried it with benefit in internal hemorrhage. Drs. Porter and Winkoop also report cases in which they have employed it with success. See Journal des Sc. Méd. 154. According to Dr. Ives, of New Haven, it is a mild narcotic. Drs. Pendleton and Rogers, of New York, obtained favorable effects from it in incipient phthisis and hemorrhage from the lungs. See New York Med. and Phys. Journal i, 179; U. S. Disp. 436; Raf. Med. Fl. 11. As a direct sedative, it is useful in diminishing the frequency of the pulse, quieting irritation, and allaying cough. Practitioners, observes Griffith (Med. Bot. 505), are unanimous in declaring that it is an important addition to the Mat. Med. It appears to act like *digitalis* in abating the frequency of

the pulse; its use, however, not being attended with the disagreeable symptoms sometimes accompanying the employment of the latter. An infusion may be given *ad libitum*, made with one ounce of the herb macerated in a pint of boiling water. It imparts a black color to linen, woollen, and silk. This plant grows abundantly in the lower country of South Carolina.

Salvia lyrata, L. Cancer-weed. Grows in shady, rich lands; collected in St. John's; vicinity of Charleston; Richland district; Newbern. Fl. June.

Ell. Bot. Med. Notes, i, 31. "The fresh radical leaves of the plant, when bruised and applied to warts, generally destroy them;" continue the application for a day or two, and renew it every twelve hours. The leaves of the *Hieracium gronovii* are also applied in this way. The *H. venosum* is announced as a certain remedy against the bite of the rattlesnake.

Salvia officinalis. Sage. Ex. Cult.

Ed. and Vav. Mat. Méd. 268; Mér. and de L. Dict. de M. Méd. vi, 191. This is a warm aromatic, and according to the experiments of Ellinger, is possessed of marked antispasmodic power: it strengthens the circulatory, cutaneous, and digestive functions; stimulates the action of the nerves, and has a decided effect upon the cephalic organs (see Mérat and authors); prescribed as a stomachic, and in catarrhal and cellular infiltration, and used as a gargle in mucous angina and fungous ulcers. "*Cur moriatur homo cui salvia crescit in horto?*" became an adage, so much confidence was formerly reposed in the plant. Its reputation is most extensive in domestic practice, the warm infusions being given as a sudorific, and in promoting the menstrual discharge. The plant is said to have great power in resisting the putrefaction of animal substances. Van Swieten, Com. ii, 370; Woodv. Med. Bot. It is thought to have a remarkable efficacy in stopping night sweats, infused in wine or spirits, and this opinion was sustained by Quarin,

Methodus Medend. 37. Baron Van Swieten also found it efficacious in restraining the inordinate flow of milk after weaning children. In the English Physician, p. 295, the quaint author, Nich. Culpepper, gent., "Student in Physic and Astrology," mentions it as an aphrodisiac: "Helpeth conception and hinders miscarriage." "Jupiter claims this, and bids me tell you it is good for the liver and to breed blood!" The essential oil deposits camphor in abundance, hence employed as a friction in rheumatism, paralysis, etc. Journal de Pharm. xvi, 574.

I introduce the following on the cultivation of

Sage.—The cultivation of this herb is among the most profitable of the market gardener's products. Large quantities of it are sold while green during the season, as every housekeeper uses it in the cooking of game, or water-fowl, and it is essential as a component of sausages, so that tons of it are used in the winter season. At the price it is usually retailed in the markets of our larger cities, an acre of sage plants will yield a return of over seven hundred dollars; and at the wholesale price, it will give a return of over three hundred dollars to the acre. The seed can be had of most seedsmen. It should be sown in any light, loamy soil, covered about half an inch deep; and when the plants are about two inches high, should be picked out and replanted at distances of about one foot each way. As soon as it has grown so as to begin to show form of flower buds, cut it off to within two inches of the ground, and so on, again and again, throughout the season. If planted on land thoroughly drained, the plant will stand many years; but plants not over two years old produce the best flavored leaves.

Monarda punctata, L. Dotted monarda; horsemint; origanum. Grows in rich and damp soils; collected in St. John's, where it is found abundantly; vicinity of Charleston; Richland district; Spartanburg. Fl. August.

Chap. Therap. and Mat. Med. ii, 302; Ell. Bot. Med. Notes, 30; U. S. Disp. 462; Am. Med. Record. ii, 496;

Ball. and Gar. Mat. Med. 360; Mér. and de L. Dict. de M. Méd. iv, 444; Bull des Sci. Méd. de Férus, xi, 302. This is another of our very aromatic indigenous plants, possessing stimulant and carminative powers, and regarded as a very popular emmenagogue among those residing in this country. The French authorities speak favorably of it; an aromatic oil is obtained from this; and the infusion of the leaves, recent or dried, is very efficient in allaying nausea and vomiting in bilious fevers. Dr. Chapman mentions cases of long-standing deafness cured by the oil rubbed on the head as a counter-irritant. It was used in cases of this description, and in many diseases, by Dr. Atlee, of Philadelphia; see his essay; among other affections in hemiplegia and paralytic diseases, in the sinking state of epidemic typhus, in cholera infantum, where there is prostration of strength, and in mania a potu; sometimes employing a liniment (see Chap. Therap. and Mat. Med. ii, 305); and sometimes the undiluted oil rubbed on the parts. The oil is of an amber color approaching to red, and if exposed to a great degree of heat, leaves a beautiful straw-colored *camphor!*

Thymus vulgaris. Ex. Cultivated in South Carolina. A well-known warm aromatic.

Collinsonia Canadensis. Gravel root; horseweed; knotweed; *Canadian collinsonia.* Grows in the mountains of South Carolina. Fl. September.

The root is used in colic from lochial discharge. Linn. Veg. M. Med. 9. "The infusion of the bruised root in cider cured several alarming cases of dropsy." Shec. Flora Carol. 482, and Mease's Domestic Encyc. ii, 177. Dr. Wood says it possesses tonic, astringent, diuretic, and diaphoretic powers; the root in substance, even in small doses, is said to irritate the stomach, and produces vomiting; the active principle is volatile, so that it is best employed in the fresh state. The decoction is efficacious in catarrh of the bladder, leucorrhœa, gravel, dropsy, etc.,

and as a cataplasm to internal abdominal pains. U. S. Disp. 1248. ,Mérat says, Dict. de M. Méd. ii, 364, that in America it merits the name all heal (*guérit tout*), having the properties referred to above. Drs. A. French and Beers speak highly of it in pains of the bladder, in ascites, and dropsy of the ovaries; given, also, as a powerful tonic in putrid and malignant fevers, and in leucorrhœa; the contused leaves are applied to bruises, lividities (*les meurtrisseurs*), pains in the stomach, and as an application to eruptions produced by the poisonous sumachs. (See *Rhus.*) The plant, by chemical analysis, contains tannin, gallic acid, extractive matter, and a coloring principle. *Op. cit.* See, also, Ann. de la Soc. Linn. de Paris, v. 508. In his late work, Griffith (Med. Bot. 513) states that externally it has been employed as a friction in rheumatism. See account of it by Dr. Hooker, of New Haven, Ann. Linn. Soc. Dr. H. thinks the infusion should be made with a gentle heat, in a close vessel. The best preparation is supposed to be the essential oil, which is said to be an excellent tonic, given with benefit in low fevers, exhaustion of the forces, etc. This plant certainly merits further notice.

Collinsonia anisata. Griffith's Med. Bot. 515.

It possesses an odor somewhat similar to that of aniseseed, having the properties of the *C. Canaden.*

Collinsonia scabra. Rough-leaved collinsonia. Collected in St. John's, in shaded soils. Fl. June.

Mér. and de L. Dict. de M. Méd. ii, 364. It is possessed of properties similar to those of the *C. Canaden.* Tonic, astringent, and diuretic. See *C. Canaden.*

Cunila mariana, Mx. Dittany; Maryland cunila. Grows in the mountains of South Carolina; Richland; I find it abundant in Spartanburg district, S. C.

Bart. M. Bot. ii, 175; Mér. and de L. Dict. de M. Méd. ii, 517; Lind. Nat. Syst. Bot. 276; Ell. Bot. Med. Notes, 127. The infusion forms a pleasant and refreshing drink;

it is diaphoretic, and is employed in fevers and colds. A gentleman in Spartanburg district, S. C., tells me that in his day "everybody cured everything with dittany." Doubtless they took less mercury and drastic purgatives in consequence.

Hedeoma pulegioides, Pursh. Pennyroyal; tickweed. Grows in the upper districts, and among the mountains of South Carolina; abundant in Spartanburg, S. C.

U. S. Disp. 365; Bart. M. Bot. ii, 165; Lind. Nat. Syst. 276, and Flora Med. 491; Griffith's Med. Bot. 508; Raf. Med. Fl. i, 231; Bart. Veg. Mat. Med. ii, 165. A gently stimulant aromatic, given in flatulent colic, and sick stomach; also as a stimulant diaphoretic in catarrhs and rheumatism. The warm infusion is a convenient and useful prescription, which is largely employed in popular practice in promoting the menstrual discharge. It is said that the plant, or the oil extracted from it, is an effectual remedy against the attacks of ticks, fleas, and mosquitoes.

Prunella vulgaris. Heal-all. Grows in dry soils; collected in St. John's, Berkley. Fl. July.

Le. M. Med. ii, 245; Med. Dict. by Carr, art. Brunella; U. S. Disp. 1291; Ed. and Vav. Mat. Méd. 276; Mér. and de L. Dict. de M. Méd. v, 520. This plant, though possessing some power as a stimulant, has fallen into disrepute. It was also used as an astringent in affections of the throat.

Scutellaria lateriflora. Mad-dog scullcap; hoodwort. Grows along ditches; Richland, Gibbes; collected in St. John's; Elliott says it is found in the mountainous districts.

Watson's Pract. Physic, 386; U. S. Disp. 1294, Appendix; Mér. and de L. Dict. de M. Méd. vi, 274; Bulletin de la Faculté, vii, 191, ann. 1820, where Spalding's (of Geo.) report concerning its antihydrophobic virtues is referred to. Youatt spoke in favorable terms of this remedy as enjoying the reputation for some time of being the only one for this disease. See Watson, *loc. cit.*

Scutellaria integrifolia, L. Diffused in swampy soils; collected in St. John's; vicinity of Charleston. Fl. June.
U. S. Disp. 1294.

Nepeta cataria, L. Catnip. Nat. in upper districts; collected also in St. John s; vicinity of Charleston. Fl. July.
Le. Mat. Med. ii, 130; U S. Disp. 191; Ed. and Vav. Mat. Méd. 216; Bergii, Mat. Med. ii, 540; Mér. and de L. Dict. de M. Méd. iv, 592; Dém. Élém. de Bot. 248; Am. Herbal, 26. This plant is possessed of stimulant, tonic, and warm aromatic virtues. Employed in popular practice in colds, asthma, amenorrhœa, chlorosis, hysteria, and the flatulent colic of infants; in the latter condition this herb is universally employed. It was also used in yellow fever, and, like many others, enjoyed an ephemeral reputation as a remedy in hydrophobia. An iufusion of the flowers was said to open obstructions of the liver and spleen. In the Supplement to the Dict. Univ. de M. Méd. 1846, 509, it is stated that Dr. Guastamachia had used the *N. cataria* with great advantage in toothache, caused by cold or carious bone, mashing the leaves in the decayed tooth; this produces an abundant flow of saliva, and causes the pain to cease in a few moments. See, also, Journal de Chim. Med. vii, 2d series. The dose of the powder is a drachm and a half. This plant is used by the vegetable practitioners. Cats roll in it with the same avidity that they do in valerian, and cover it with their urine.

Dracocephalum variegatum. Vent. Grows in inundated swamps; roots frequently immersed. Collected in St. John's, Berkley; in the Santee swamps, near Somerset Pl.; vicinity of Charleston. Fl. July.
Mér. and de L. Dict. de M. Méd. ii, 682. The organization of the peduncle is peculiar. See observations on certain phenomena attending the plant called the *D. Americanum*. Acad. des Sci. 276, 1702. It is supposed to possess a "cataleptic power." "Pourvues de cette singulière faculté," namely: "la propriété, de la cataleptique, c'est-a-

dire, de garder la position dans laquelle on place la fleur." Supplem. to Dict. Univ. de M. Méd. 252, 1846.

Dracocephalum Virginianum, L. Grows in the mountains of South Carolina.

Its properties are similar to those possessed by the preceding.

Leonurus cardiaca, L. Motherwort. Nat. Grows around buildings; vicinity of Charleston. Fl. July.

"The leaves are deobstruent, laxative, diaphoretic, emmenagogue, antihysteric, and anthelmintic." Am. Herbal, 230; Linn. Veg. M. Med. 168. L. states that the herb, drunk as a tea, is useful in hysteria and hypochondriacal affections. Griffith, in his work on Med. Bot. 515, supposes it to be tonic, and to relieve palpitation of the heart. It is extolled in Russia as a preservative against hydrophobia. In the "Indian Materia Medica" it is stated that "an infusion of the plant is a stimulant, cordial bitter, and when taken at bedtime it procures a quiet, refreshing sleep, even where opium and laudanum have failed." It is probably useful as an ingredient for a soothing tea. See Linden, "*Tilia.*"

Marrubium vulgare. Ex. Nat. Horehound.

Pe. Mat. Med. and Therap. ii, 284; Watson's Pract. Physic, 118 and 332; Ed. and Vav. Mat. Méd. 273; Trous. et Pid. Mat. Med.; Traité de Thérap. 308; Royle, Mat. Med. 470; Le. Mat. Med. ii, 89; U. S. Disp. 452; Ball. and Gar. Mat. Med. 358; Matson's Veg. Pract.; Cullen, Mat. Med. ii, 154; Bergii, Mat. Med. ii, 558; Woodv. Med. Bot. In the United States, it is used only as a warm, aromatic stimulant. The leaves are tonic and somewhat laxative, and are employed in colds, asthma, hysteria, and menorrhagic diseases. The warm infusion acts as a sudorific, and is applicable as a palliative in phthisis and peripneumonia, but is not allowed the possession of any very decided powers. In the Supplem., however, to the Dict.

Uni. de M. Med. 457, 1846, it is said to be certainly useful in chronic rheumatism, one ounce and a half of the infusion being given morning and evening. See, also, the Journal des Connaissances Medic. Dec. 10, 1836. Ferrein notices the root as an excellent vermifuge. Mat. Med. i, 279, iii, 312; and Desbois de Rochefort says the decoction of three or four ounces is a good remedy in tænia. Dr. Cutler asserted that the infusion was a very useful application in salivation. Am. Herbal, by J. Stearns, LL.D. Griffith states that obstinate catarrhs are much benefited by the expressed juice taken in milk. Dose, one drachm of the powder, or one ounce to two ounces of the infusion made with an ounce of the dried herb to one pint of boiling water. From this plant it is well known the candy so much used in pectoral affections is made.

The horehound has a bitter taste and an aromatic odor. "It possesses tonic, diuretic, and laxative properties, and it seems to owe all its powers to a bitter extractive, a volatile oil, and gallic acid." Used in coughs, colds, asthma, etc., on account of the combination of moderate qualities just described. From the very fact of its simplicity, I consider it one of the very best remedies for children and infants suffering with colds and coughs. Given during the day with opiates, and nitre at night, it restores appetite, is expectorant and duretic, and thus removes the slight remains of cold and fever so frequent with children. If the fever is a prominent symptom ipecacuanha should also be used. Besides, it may perform a most important role in taking the place of more active and injurious drugs. I know of no *better remedy* for colds and coughs than the juice of horehound sweetened and given during the day.

VERBENACEÆ. (*The Vervain Tribe.*)

Callicarpa Americana, Mx. French mulberry. Collected in St. John's, Berkley, in dry soils; vicinity of Charleston; Richland district; Newbern.

Drayton's View of S. C. 62. This is said to be useful in dropsical complaints. It bears very pretty red berries,

growing in whorls around the stem, which are slightly sweetish to the taste. I could not extract much coloring matter from their skins with vinegar or alum.

Verbena urticifolia, L. Nettle-leaf vervain. Common in damp soils; collected in St. John's; vicinity of Charleston. Fl. July.

U. S. Disp. 1304. Boiled in milk and water, and combined with the inner bark of the white oak, it is advantageously used in poisoning from the sumachs (*Rhus*). Mér. and de L. Dict. de M. Méd. vi, 868; Journal de Méd. lxx, 529.

Verbena hastata, L. Vervain; Simpler's joy. Middle districts of South Carolina, and in Georgia; vicinity of Charleston; Newbern. Fl. Aug.

U. S. Disp. 1304. This is more bitter than the European species, and it is said to be emetic. This plant is described by the "Cherokee Physician" as an emetic inferior to the "Indian Physic;" a decoction of the dry or green herb or a powder is prescribed like lobelia. A decoction of the root is used to check fevers when given in the early stage. The plant should be examined.

Verbena aubletia, L. Grows in the middle districts of South Carolina and in Georgia. Fl. Sept.

Mér and de L. Dict. de M. Méd. vi, 865. It is said to contain a very acrid mucilage. Dic. des. Sci. Nat. x, 426.

PEDALIACEÆ. (*The Oil Seed Tribe.*)

Sesamum Indicum. }
" *Orientale.* } Bené. Introduced by the Africans. Fl. July.

This is the sesame of the Anabasis, mentioned also by Dioscorides, Theophrastus, and others. The seeds contain an abundance of fixed oil as tasteless as olive, and for which it may be substituted; it is said to be used extensively in Egypt and Arabia. Lind. Nat. Syst. 280; U. S. Disp. 661. Mérat says that in Egypt they drink large

quantities of the oil morning and evening, to give them *embonpoint*. It is also used medicinally as a laxative, and is by some preferred to castor oil; also as an application to furfuraceous eruptions. In India it is regarded as an emmenagogue and as provocative of abortion; employed in cutaneous affections and ophthalmia; a solution is given in colic and dysentery, and used as an application for softening the skin. Mér. and de L. Dict. de M. Méd. vi, 332, and the Supplem. 1846, 657, according to which it is also becoming an object of considerable commercial importance, being substituted for olive oil in the manufacture of Marseilles soap. See Essay of M. Hardy, Revue Agricole, Avril, 1845, 177. In the Trans. Phil. Soc., it is said that one hundred parts of the seed yield ninety of oil. Coxe, Am. Disp., art. *Sesam. orient.*, states it was found beneficial in a dysentery which prevailed in 1803. We have seen it given to some extent, and with great advantage, in New York, in diarrhœa and dysentery, particularly in these affections as they occur in children; two or three of the leaves, thrown in water, are sufficient to render it very mucilaginous. This is taken internally. It also serves as a convenient vehicle for enemata, gargles, collyria, etc. In South Carolina the seeds are largely used by the negroes in making broths. They are also eaten parched, and are made with sugar into a very nice candy. It might be made a source of profit to raise the plant in the Confederate States, as it grows well and the seeds bring a high price.

The above was contained in my report on the Med. Bot. of South Carolina, published in 1849.

The oil pressed from the seed will keep many years without acquiring any rancid taste, but in two years becomes quite mild, so that the warm taste of the oil when first drawn is worn off, and it can be used for salads and all the ordinary purposes of sweet oil. In some countries it is used for frying fish, as a varnish, and for some medicinal purposes. Nine pounds of seed are said to yield upward of two pounds of fine oil. The oil may be extracted by

bruising the seed and immersing them in hot water, when the oil rises on the surface and may be skimmed off. But the usual mode of extraction is similar to that practised in the expression of linseed oil. The plant is generally sowed in drills about four feet apart, in the month of April. Am. Farm. Encyc. I consider, after examination, that the sassafras leaf contains more mucilage than the Bené, and that both should be gathered and cured for winter use in making mucilaginous teas to be used in dysenteries, pulmonary diseases, etc.

From a statement of H. M. Bry, of Louisiana, P O. Rep., 1854, p. 225, sixteen bushels of seed of Bené plant (*S. orientale*) was sent to a mill in Cincinnati to be manufactured into oil. It yielded thirty-nine gallons of clear oil and about five quarts of refuse oil, or about two and a half gallons to the bushel. In consequence of the mill imparting the flavor of flaxseed he could not use it as a salad oil, for which purpose he was confident it would be superior, when pure, to the adulterated imported olive oil. It was used, however, as a substitute for castor oil. All who used it praised it for its gently purgative effect, and because it was free from the nauseous taste peculiar to castor oil. Twenty bushels is believed to be a moderate estimate of the amount of the seed produced by an acre. It yields a gallon of oil to the bushel more than flaxseed.

The excellent effect of the leaves steeped in water as a mucilage to be used in diarrhœa and dysentery is testified to by all persons who have used it. For this purpose two or three leaves are soaked in a tumbler of water and administered repeatedly. This plant will act as a substitute for gum-arabic on account of the mucilage it yields. It should be used in the bowel affections of children and among our soldiers in camp. Planters should collect and cure all the leaves at their disposal. At page 338 of the same volume another paper on the Bené is to be found. It is there stated that the plant will throw out a great profusion of leaves by breaking off the top when it is half grown.

Nelson quotes Miller on the Bené, as cultivated by the African negroes in South Carolina: "The inhabitants of that country make an oil from the seed which will keep many years and not take any rancid smell or taste, but in two years becomes quite mild; so that when the warm taste of the seed which is in the oil when first drawn is worn off they use it as a salad oil and for all the purposes of sweet oil. The seeds are also used by the negroes for food—which seed they parch over the fire and then mix with water and stew other ingredients with them, which makes a hearty food." Rural Cyc.

The seeds of the Bené, the myrtle, and the tallow tree, with the fruit of the ground-nut (*Arachis*) might afford useful material to the soap manufacturers within the Confederate States. I will insert here what I have upon the *oleiferous* plants most useful to us in the present exigency. In Boussingault's treatise on the subject of *oils*, pages 135 and 139, he says:

"The following sums may be taken as a pretty accurate estimate of the average quantity of oil yielded by the different oleaginous seeds: colewort, winter rape, and other species of cruciferous plants, from 30 to 36 and 40 per cent.; sunflower about 15 per cent.; linseed (flax) from 11 to 22; poppy from 34 to 63; hemp-seed from 14 to 26; olives from 9 to 11; walnuts 40 to 70; Brazil nuts 60; castor oil beans 62; sweet almonds 40 to 54; bitter almonds 25 to 46; *Modiva sativa* 26 to 28 per cent." I would refer the reader to a more extensive table than this in Ure's Dictionary of Arts. I have little doubt that the Chinese tallow tree (*Stillingia sebifera*) introduced and growing around Charleston is richer than any above mentioned. Hickory nuts, when bearing abundantly, broken and thrown in a vessel of boiling water, would no doubt yield oil abundantly and cheaply for soap. I have, however, upon experiment found it difficult to extract the oil (1862).

The plants most commonly cultivated for the production of oil belong to the genus *Brassica;* all plants of this genus produce seeds containing considerable quantities of

oil, and are sometimes used for obtaining it. All the species are biennial, save the spring colza, or field cabbage (*Brassica campestris*). It is not, as some suppose, a degenerated variety of autumnal rape or cole seed, but really a distinct species. "Thaër's Principles of Agriculture," p. 449. In the description by this author of colza and rape (autumnal varieties), he lays great stress upon the great value of the colza (*Brassica oleracea lacineata*, a variety of the garden cabbage), as perhaps one of the most abundant in the oil it gives out. The rape, a variety of the *Brassica napus*, is less productive. The colza (*Brassica campestris*) requires a dry soil. I introduce this information here because the plant might be cultivated to great advantage in the Confederate States for supplying oil, and because Thaër adds at the conclusion of his paper that the seeds of the *ruta baga*, or Swedish turnip, which is already grown extensively throughout the Southern states, are equally rich in oil. For the method of culture and gathering, see Thaër's work, published in New York, 1857. It is also an excellent plant for fodder. The seed does not mature well in South Carolina. The oil is obtained by a press or oil mill. Even the spring rape (*Brassica campestris*) yields more than twenty pounds of oil per bushel. The rape is grown and produces well in Clarendon district, S. C., Mr. Sanders informs me. It will produce seed.

I would particularly advise the extensive introduction and cultivation of the rape in the Confederate States, both because it grows and matures well, and because of the amount of oil the seeds afford, which would supply whatever is necessary in making soap (for processes, see Ure's "Dictionary of Arts and Manufactures"), and also because it would allow the Southern planter to devote the tallow, grease, etc., which has been economized for this purpose, to the support of his slaves. The Bené probably yields as much oil as any plant we possess, as I am informed by a practical gardener. See, also, flaxseed, Chinese tallow tree, etc.

Mustard seed oil concretes when cooled a little below

32° Fahr. The white or yellow seed (Ure's Dictionary of Arts and Sciences, p. 285) afford thirty-six per cent. of oil, and the black seed eighteen per cent. I would refer the inquirer to Ure's Dictionary for paper on the subject of the oils, mode of obtaining, etc. Also to Kurten's work on the "Art of manufacturing Soaps, including the most recent discoveries—with receipts for making camphene oil, candles, etc. Phil.: Lindsay & Blakiston, 1854." This treatise gives very plain directions concerning the articles necessary. In Ure's Dictionary a plan of an oil mill is given, and information on "seed crushing" and extraction of all oils. Ure says that the oil of colza is obtained from the seeds of the *Brassica campestris* to the amount of thirty-nine per cent. of their weight. "It forms an excellent lamp oil, and is much employed in France." Hemp-seed oil resembles the preceding, but has a disagreeable smell and a mouldish taste. It is used extensively for making both soaps and varnishes. Linseed oil is obtained in greatest purity by cold pressure, but by a steam heat of 200° Fahr. a very good oil may be procured in larger quantity. "The proportion of oil," Ure adds, "usually stated by authors is twenty-two per cent. of the weight of the seed, but Mr. Blundell informs me that by his plan of hydraulic pressure he obtained from twenty-six to twenty-seven." In the *Encyc. Metropolitana*, under "Oil-press," a quarter of seed (whose average weight is four hundred pounds) is said to yield twenty gallons of oil. Now, as the gallon of linseed oil weighs 9.3 pounds, the total product will be one hundred and eighty-six pounds, which amounts to more than forty-five per cent., an extravagant statement, about double the ordinary product in oil mills, etc., etc. When kept long cool, in a cask partly open, it deposits masses of white stearine along with a brownish powder. This stearine is very difficult of saponification. The reader is referred to the last paragraph of p. 297 of Ure's Dictionary, vol. ii, and all of p. 298, ending at word "Dutch plan," top of p. 299; and on the subject of oils,

soap, candles, starch, and sugar, I would refer to the same work, where many of the best processes are described.

Chaptal, in his Chemistry applied to Agriculture, makes the following practical remarks on oils: "The oils are fat, unctuous bodies, of various degrees of fluidity, insoluble in water, forming soap with the alkalies, and burning and evaporating at different temperatures. It is the last characteristic particularly which establishes that difference among them by which they are divided into fixed and volatile oils. The fixed oils are contained in seeds and fruits, from which they are extracted by pressure. The first portion which is expressed is the purest, and is known by the name of virgin oil; that which follows is rendered more or less impure by the mixture of other principles contained in the fruit submitted to compression. It is particularly by the mucilage, which is found in greater or less quantity in all vegetables, that the purity of oil is affected. After all the oil which can be extracted by pressure has been drawn off, it is customary to moisten the mash with boiling water and to subject it to another and more powerful pressure; but the oil thus obtained carries with it a large portion of mucilage, and is usually employed only in some of the trades. In some countries it is customary to collect the fruits into heaps and to subject them to a degree of fermentation before pressure; by this means the extraction of the oil is rendered easier and the quantity of it is increased, but the quality of it is much injured. Similar results are obtained by breaking the fruit previous to expressing the oil. It would be hardly right to condemn these last methods as erroneous, because in the numerous soap-works, dye-houses, cloth manufactories, etc., this quality of oil is preferred to that which is purer. The learned will do well to condemn the processes now employed for procuring the fine oils, and to present others by which we may obtain them purer and of a better taste; but the grand consumption of the oils is in the manufactories, and there the fine oils would but imperfectly replace those of a coarser kind; thus, by perfecting the produce

the usefulness of it would be lessened. When oil is to be extracted for domestic purposes it is without doubt desirable that it be obtained as pure as possible, but that which is destined to be employed in the trades and in manufactures, as in that of soaps for example, is the better for being combined with a portion of mucilage. The great art of manufacturing consists in appropriating the products to the wants and tastes of consumers. When mucilage is so abundant in an oily seed that it yields upon expression only a pasty combination of mucilage and oil, the seed is dried by fire: when the mucilage is thus deprived of fluidity the oil flows off pure. In this manner the seeds of flax, of poppies, of henbane, etc., are prepared for expression. Nearly all the oils are colored, and contain some of the principles of the fruits from which they are procured; these are in some of their effects injurious to the oil, and great pains have been taken to find some means of freeing it from them. Oil is clarified to a certain degree merely by standing in a cool place in open earthen vessels; it forms a deposit, and is thus rendered purer, clearer, and better. If oil is exposed to the sun it gradually loses its color. In order to clarify the oil of mustard one per cent. of sulphuric acid is put into a large earthen pan into which the oil is thrown and carefully stirred; the oil becomes green, and upon being allowed to remain at rest forms upon the sides and bottom of the pan a blackish deposit, which is principally composed of carbon; the process must be repeated after a few days if the oil has not acquired the wished for clearness. But before using the oil it is necessary that it be allowed to remain for some time undisturbed. In this operation the mucilage appears to be precipitated and consumed by the acid. Most fixed oils contain some mucilage, and most of them become rancid.

"Most fixed oils have but in a very slight degree the property of drying, but some of them acquire it by being combined with some metallic oxide, and this greatly increases the use of them, as they can in this way be

employed as varnishes for covering bodies which it is necessary to preserve from air and water, or as the recipients of colors to be used in painting upon cloth, wood, or metal. The best drying oils are those of flax-seed, nuts, and poppies. Linseed oil will dissolve at boiling temperature one-quarter of its weight of that oxide of lead known in commerce by the name of litharge. It becomes brown in proportion as the oxide is dissolved; when saturated with the oxide it thickens by cooling, and it is necessary to render it liquid by heat at the time of using it. In consequence of the numerous purposes to which the fixed oils are applied the consumption of them is immense; they form the basis of the soaps, both soft and hard, according as they are combined with potash or soda; they are used to fix in the most durable manner upon cotton the colors obtained from madder; they are employed to facilitate the operations in all establishments for carding and spinning wool. It is by the use of oil that the play of all machinery is rendered more regular and easy, and that friction is moderated, and by it metals are preserved from rusting. The most important use to which oil has been applied is that of lighting buildings, the defects of the light being remedied by argands and other lamps which aid in the consumption of the carbon by admitting more air to the wick.

"The volatile oils do not belong exclusively to any one part of plants; in some, as in the Bohemian angelica, the oil is distributed throughout the whole plant; sometimes, as in balm, mint, and wormwood, it is found in the leaves and stalks; the elecampane, florence iris, and bennet contain it in their roots; thyme and rosemary in their leaves and flower buds; lavender and the rose in their calyces; chamomile, lemon, and orange plants in their flowers; the petals and the rind of the fruit of the two last abound in oil; that of the indigo and fennel is contained in vessels forming the raised lines which may be perceived on the bark. Volatile oils vary in color, consistency, and weight; there are some, as those of sassafras and the clove, for instance, which are

heavier than water; and there are some, as those of the rose and parsley, that remain in a concrete state at the usual temperature of the air, etc.

"The volatile oils are extracted either by distillation or expression. When the oil is contained in vesicles upon the surface of the rind, as in those of the lemon and bergamot, the cells may be broken and the oil caused to flow out by merely rubbing the rinds together; or the rinds may be taken off by grating, and the oil separated from the pulp by a light pressure, or by allowing the whole to remain undisturbed for a few days, when the pulp will settle at the bottom and the oil remain floating above it. When these rinds are scraped with a bit of sugar, the oil combines with it, forming an *oleo-saccharum*, useful in giving a pleasant flavor to liquors."

Count Chaptal gives this simple process for extraction of oils: "With the exception of the oils of which I have just spoken, all the volatile oils are extracted by distillation; in this process the plant is put into the boiler of the alembic and covered with water; when the water boils the oil rises with the steam, and is condensed with that in the worm of the still, whence they flow together into the receiver; the oil which swims upon the top is separated from the water, and this water, which has a milky appearance, is again employed from preference in new distillations. It is customary to make use of a narrow straight-necked vessel as a receiver; the oil collects in the upper part of this, while the water passes off through a siphon in the side about four inches below the neck. In the south of Europe where great quantities of the volatile oils are prepared, the distillers place their portable apparatus in the open air, in those places which offer a plentiful harvest of aromatic plants; when these are exhausted they remove elsewhere.

"The aromatic oils are employed particularly as perfumes, and for this purpose are often combined with other substances. They are likewise used in the manufacture of varnishes, from the readiness with which they dissolve colors, and from their quick evaporation after being applied."

At Cannes, in the south of France, I have myself witnessed the operations for extraction of essence of roses, which are planted in great abundance. On the plantations in South Carolina rose-water is distilled from the petals of the sweet rose by a simple process.

BIGNONIACEÆ. (*The Trumpet-flower Tribe.*)

Bignonia crucigera, Walt. (N. A. F.) }
" *capreolata*, L. and Ell. Sk. } Rich, shaded soils; collected in St. John's, Berkley; vicinity of Charleston. Fl. March.

Shec. Flora Carol. 278. See *B. crucigera*, Walt. The root and vine, in infusion or decoction, answer the purpose of sarsaparilla. It is detergent and alterative, aperient, diuretic, and sudorific, used in syphilis, chronic rheumatism, and in derangements arising from impurities of the blood. The pith is said to be divided longitudinally into four equal parts, so that when the stem is cut transversely it exhibits the appearance of a cross, and hence Walter's name. This vine appears to be possessed of instinct; it shoots up to the highest tops of trees before sending out a branch.

Bignonia catalpa, Mx. }
Catalpa cordifolia, Ell. Sk. } Catalpa. Grows in the upper and lower country of South Carolina; collected in St. John's. Fl. May.

Mér. and de L. Dict. de M. Méd.; Supplem. 1846, 107. The physicians at Naples, after the favorable report of Thunberg and Kæmpher, as well as those of Brera, have given incontestable evidence of the advantages resulting from its use in asthma. The decoction of the fruit is also employed. See Gazette Médicale, 8, 1834; Journal de Chim. Méd. x, 164. Kæmpher says he also applied the leaves to the painful part. Poultry are said to thrive on and to be fond of the seeds. The timber makes durable posts. I find no notice of the plant in the American works. The honey collected from the flowers is somewhat poisonous—resembling, though less active, that collected from the yellow jessamine. See following.

Gelseminum sempervirens, Juss. Jessamine. Grows in swamps; diffused through the alluvial regions. It is observed that it is gradually gaining ground in the upper country. I have noticed it just beyond Columbia, and neär Norfolk, Va.

Ell. Bot. Med. Notes, 312; Frost's Elems. Mat. Med. 490. "Possessed of narcotic properties to a very considerable degree." A spirituous tincture of the root is used with success in rheumatism. It is also employed in gonorrhœa; ninety drops of the bark of the root in tincture, taken in three doses, produce vertigo, perverted vision, etc. Its marked effect on the nervous system has been repeatedly observed.

The root of the jessamine has been much more freely used since the publication of my report on the Med. Bot. of South Carolina, made to the Am. Med. Association, 1849. Special articles can be found descriptive of its uses in the Charleston Medical Journal. Dr. Mays, of South Carolina, has contributed one of these. Drs. Ford and White used the tincture of the root as they did that of the *Veratrum viride* in yellow fever, for its depressing influence upon the circulation; see Ch. Journal. Many employ the tincture of the root in fevers; it acts in a manner similar to digitalis and *V viride*, with the addition of some narcotic property. It has to be used with caution on these accounts, and because it induces delirium in overdose. I regret my inability at this moment to make direct reference to the authorities. Stillé's Therap. and Dunglison's New Remedies may be consulted. My venerable friend Dr. John Douglass, of Chester, S. C., writes me that he has used it repeatedly with advantage in gonorrhœa; see his letter which I published in Ch. Med. Journal. The active principle, *gelseminine*, is much used latterly by a certain school of practitioners at the North and West, with other substances of similar nomenclature.

I give the following statement of the method of extracting the perfumed oil of flowers, as it may enable those living where the jessamine, rose, violet, and other flowers bloom in such abundance, to prepare it. "The essence of

rose, of jessamine, violet, etc., are possessed of a more feeble odor, and being obtained from the flowers of their respective plants, require much care in their preparation. This is done by spreading upon white wool, impregnated with olive oil, the petals of the flowers, and leaving them for some time covered over with a woollen cloth, upon which flowers are also scattered. The flowers are renewed from time to time, until the olive oil employed appears to be saturated with the oil of the flowers, when this last is separated by digesting the wool in alcohol." Wilson's Rural Cyc.; consult, also, Ure's Dictionary of Arts, and Chaptal's Chemistry applied to Agriculture; also Bené (*Sesamum*) in this volume. I have seen in the south of France young girls manufacturing essence of rose. Our Southern matrons do not lack jessamine flowers or rose petals for making perfumes, essences, rose-water, etc.

VALERIANACEÆ. (*Valerian Tribe.*)

Valeriana scandens, L. East Florida. Chap.

We have also *V pauciflora*, Mx. Growing on mountains of Tennessee. They should be examined on account of their relations with the officinal valerian.

ACANTHACEÆ. (*The Justicia Tribe.*)

Ruellia strepens, L. Grows in pine barrens; collected in John's; vicinity of Charleston. Fl. July.

Ainslie, ii, 153; Lind. Nat. Syst. Bot. 285. The leaves are said to be subacrid.

OROBANCHACEÆ. (*The Broom-rape Tribe.*)

Orobanche uniflora, L. Squaw-root; cancer-root; broom-rape. Grows in pine barrens in the middle district.

U. S. Disp. 1282. It is said to possess properties similar to the following:

Orobanche Virginiana, L.
Epiphegus Americana, Nuttall. } Beech-drop. Grows on beech trees exclusively; vicinity of Charleston; Newbern. Fl. August.

U. S. Disp. 128. It has a bitter, nauseous, astringent taste, diminished by drying; it is given internally in bowel affections. Dr. Barton thought it was one of the ingredients of a secret remedy for cancer, known as Martin's cancer powder. This is supposed to possess some of the powerful astringency belonging to the *O. major*. Michaux says that in Virginia they use the powder in inveterate ulcers and cancers. Lind. Nat. Syst. 288; Bart. Med. Bot. ii, 38; Mér. and de L. Dict. de M. Méd. iv, 102.

Orobanche Americana, L. Collected in St. John's in rich soils; vicinity of Charleston. Fl. July.

This has been also used as a remedy in carcinomatous affections, ulcers, etc.

SCROPHULARIACEÆ. (*The Figwort Tribe.*)

Generally acrid and bitterish, sometimes dangerous in their properties.

Verbascum thapsus, Walt. Mullein. Diffused; grows in pastures, upper and lower country of South Carolina; vicinity of Charleston; Newbern. Fl. July.

Le. Mat. Med. ii, 446; Pe. Mat. Med. ii, 295; U. S. Disp. 735; Watson's Pract. Physic, 202; Royle, Mat. Med. 493; Journal de Chim. Med. ii, 223; Home, Clin. Experiments and Hist.; Bergii, Mat. Med. i, 118; Mér. and de L. Dict. de M. Méd. vi, 864; Bull. des Sc. Méd. de Férus, xvi, 341. The leaves of the flowers contain a narcotic principle; a decoction of the flowers and leaves as tea, is beneficial in dysentery and tenesmus; it calms pain in the fundament caused by hemorrhoids; and it is used in the convulsions of infants, in ardor urinæ, and wherever the indication is to moderate spasm or irritation. A large quantity of the flowers will even induce sleep, so active is the narcotic principle it contains. Dém. Élém. de Bot. ii, 135; Milne, Ind. Bot. 293. The leaves of mullein, warmed and applied to the feet, have given relief to those affected with gout; and the distilled water of the flowers has been

used effectually in diseases of the skin; Mérat says in erysipelas and colics. Scopoli relates that in Carniola mullein is esteemed valuable in the pulmonary complaints affecting cattle (hence called cow's lungwort). "The roots, both recent and dried, have the property of fattening poultry, even to obesity." Thornton's Fam. Herbal, 238. It is useful in stopping or diminishing diarrhœas of long standing, and often in easing pain of the intestines, which is accounted for by the anodyne, emollient, and gently astringent qualities of the plant. Woodv. Med. Bot. ii, 343. Linnæus states, in his Veg. Mat. Med. 31, that fish will become so stupefied by eating the seeds as to allow themselves to be taken. See, also, the *Æsculus pavia*, which possesses similar powers. Dr. Wood refers to its value in pectoral diseases, coughs, etc. U. S. Disp. 736. The leaves, steeped in hot water, are applied externally as a feebly anodyne emollient dressing for sores, and are much used by the poorer class. Equal parts of mullein leaves and the bark of the root of sassafras boiled in water and concentrated, then mixed with powdered sassafras bark to form pills, are reputed valuable in the treatment of agues by the herbalists. See "Indian Guide to Health." Taken internally, the dose is four ounces, one ounce of the leaves being added to one pint of water. It would be desirable to obtain an analysis of this plant.

Verbascum lychnitis, L. Grows in South Carolina, according to Dr. Muhlenberg. Fl. July.

Dém. Élém. de Bot.; Mér. and de L. Dict. de M. Méd. vi, 863. The root has been used in jaundice. Durand gave an extract of the leaves in this disease, in pectoral affections, and in colics; no doubt beneficial, from its sharing the possession of the narcotic principle ascribed to the *V thapsus*.

Griffith states that the flowers are said to destroy mice. Med. Bot. 517.

Verbascum blattaria. Moth mullein. Grows abundantly,

according to Elliott, in the middle and upper districts; sparingly in the lower; collected in St. John's, Berkley; near the bridge at the Big Camp, on the Santee canal; vicinity of Charleston, Bach. Fl. March.

Mér. and de L. Dict. de M. Méd. vi, 863.

Scrophularia nodosa, Linn. (Prodrom.) } Vicinity of
" *Marylandica*, Ell. Sk. } Charleston, Bach.

Griffith, Med. Bot. 518. It is vulnerary and soothing, when applied as a poultice to ulcers, burns, etc.

Chelone glabra, L. Snake-head. Grows in damp soils; Richland district; collected in St. John's, Berkley; vicinity of Charleston; Newbern. Fl. July.

Griffith, Med. Bot. 520. In small doses it is laxative; large quantities purge. It acts on the liver; one drachm of the powder may be given at once. It is administered by the vegetable practitioners as an anthelmintic; also in jaundice, in hepatic disorders generally, and in constipation. It is prescribed as an alterative and tonic in impure conditions of the blood—the decoction, powder, or tincture used.

Digitalis purpurea. Digitalis; foxglove.

It is stated in one of the gazettes that this plant grows native around Charleston! See Shec. Flora Carol. 305. Elliott makes no mention of it; neither does Bachman in his Catalogue. The power this remarkable species possesses of diminishing the force of the circulation is well known. It sometimes proves violently emetic and purgative. See authors.

Gratiola officinalis, } Hedge hyssop. Nat-
" *Virginica*, of Mx. Ell. Sk. } ural. Abundant along the margins of ditches; vicinity of Charleston. Fl. April.

Bull. Plantes Vén de France, 118. It is purgative and emetic; like the arum, however, it loses much of its virtue when dried; a small quantity of the fresh root will

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purge excessively (des superpurgations extrémement dangereuses). It was used, says Lieutaud, as a hydragogue cathartic, sixty grains of the dried root being given in dropsy and intermittent fever. Thornton's Fam. Herbal, 23. It is also said to be powerfully anthelmintic, and was highly spoken of by the celebrated Boerhaave, by Hoffmann, and Dureau. "Relieves dropsy in the chest." Lind. Nat. Syst. 291. According to Vauquelin, the purgative property depends upon a peculiar substance analogous to resin, but differing from it in being soluble in hot water.

Gratiola aurea, Muhl. Vicinity of Charleston.

Griffith, Med. Bot. 519. It is said to be fully as powerful as the above, as a substitute for which it is employed; attention is called to it.

Dasystoma pubescens, Benth. }
Gerardia Flava, L. and Ell. Sk. } Abundant in rich, dry woods.

This plant, it is said, will prevent the attacks of yellow and other flies upon horses; probably owing to its great viscidity. See "*Juglans*." It is pubescent and highly viscous. It has very little taste, unless chewed for some time. Upon a subsequent examination (1862) of the *G. Flava*, I find that each hair with which the plant is covered secretes from a gland at its summit a tenacious, gummy substance, to which insects may adhere. Under the microscope it is an interesting object. The leaves of the English elder (*Sambucus nigra*) "kill several species of noxious insects, offend and banish moles, and are greedily eaten by sheep." Our *Lysimachias* should be examined, as the leaves and flowers of *L. Nummularia*, steeped in oil, have the power of destroying insects and worms which infest granaries.

Veronica officinalis. Speedwell. Grows in South Carolina, according to Pursh. Fl. May.

Linn. Veg. Mat. Med. 1. This is tonic and pectoral; used in asthmas and coughs, four spoonfuls of the expressed juice being given in the form of tea. Indig. Bot.

18. The infusion of the leaves is employed on the west coast of Africa as a drink in gravelly complaints. Drs. Frank and Scopoli wrote monographs on it; the latter affirms that he cured a very violent case, where suffocation arose from catarrhal affection, by introducing through the mouth, by a funnel, the vapor of a decoction of *Veronica*, mixed with vinegar. It contains tannin. Mér. and de L. Dict. de M. Méd. vi, 875; Flore Méd. vi, 345. It is alluded to in the U. S. Disp. as a diaphoretic, diuretic, and expectorant, which had passed out of use. Griffith refers to it as a mild astringent. Many of these plants only require examination to regain the confidence once placed in them; all being liable to the fluctuations which have characterized some that are now considered our most valuable agents.

Veronica peregrina, Mx. Neckweed. Vicinity of Charleston; Newbern.

Griffith's Med. Bot. 517 In some portions of the United States it is supposed to be very efficacious; and is used internally, and externally as a wash in scrofulous tumors on the neck.

Veronica Virginica, L. } Virginian veronica. Grows in
Leptandra, Nutt. } the mountain valleys. Fl. August.

U. S. Disp. 772; Mér. and de L. Dict. de M. Méd. vi, 816. The root is bitter and nauseous, yielding its active properties to boiling water. In the recent state it is said to act violently, sometimes as a cathartic, and sometimes as an emetic.

Under the name blackroot, Gulver's root, and the probably erroneous botanical name (*Leptandra alba*), the author of a work professing to describe the Indian mode of treating diseases, entitled the "Cherokee Physician," recommends the plant as an efficient purge: "operating with mildness and certainty;" peculiarly adapted to typhoid and bilious fevers. Dose, a large teaspoonful of the root in a

gill of boiling water, repeated in three hours. It is said to be also diaphoretic. The root may be given in any shape, and is thought to have a slow, alterative action. An extract is also used in making cathartic pills by concentrating the decoction, and using starch or liquorice root powder; or a syrup is made by adding molasses or sugar. It is laxative in tablespoonful doses. A principle called *leptandrine*, from the *Leptandra*, is much used in the Western states. An emetic decoction is made by the vegetable practitioners with the *Leptandra* root: half a pound American ipecacuanha, or the Indian physic one pound, put into a gallon of water and boiled down to a pint, of which the dose is an ounce every twenty minutes till vomiting is induced; or two teaspoonfuls of the powder may be given in an ounce of boiling water, to be repeated.

Veronica anagallis, Mich. Brook pimpernel; long-leaved brook-lime. Grows in South Carolina, according to Pursh. Nat. Fl. July.

Dém. Élém. de Bot. ii, 130. The infusion is diuretic, antiscorbutic, and vulnerary.

SOLANACEÆ. (*The Nightshade Tribe.*)

Leaves are narcotic and exciting—tubers generally wholesome.

Capsicum annuum. Pepper. Cultivated in South Carolina.

Its properties are well known. It may be used as an external irritant in place of mustard.

Solanum nigrum, L. Deadly nightshade. Grows in rich soils; collected in St. John's, Charleston district; vicinity of Charleston; Newbern. Fl. July.

Trous. et Pid. Mat. Méd. i, 206; U. S. Disp. 304; Eberle, Mat. Med. ii, 89; Ed. and Vav. Mat. Méd. 343; Royle, Mat. Med. 495; Pe. Mat. Med. and Therap. ii, 326; Le. Mat. Med. ii, 272; Mér. and de L. Dict. de M. Méd. vi, 417;

Journal de Chim. Méd. iii, 422 and 541; Nouv. Journal de Méd. x, 67; Alibert, Nouv. Éléms. de Thérap. i, 417 The berries are an active narcotic poison; one grain of these, in augmented doses, is used as a remedy for increased flow of urine. It is indicated in diseases affecting the bladder, rebellious ulcers, etc. Milne, Ind. Bot. 315; Bull. Plantes Vén. de France, 155; Dém. Élém. de Bot. ii, 139. When swallowed, headache, violent distortion of limbs, and delirium supervene. Rucke mentions a case of a family having eaten the leaves, and being attacked with swelling of the face, accompanied with burning heat, followed by gangrene. Forskall, in his Flora Ægypt. Arabica, says that an application of the bruised leaves acts as a specific in the disease termed by the Arabs bulla, and, applied with hog's lard, cures whitlows. Cæsalpinus states that the juice, or a decoction, proved useful in inflammation of the stomach. Gataker, in his "Observations on the Use of the Solanum," commenced by giving a grain, which acted gently as an evacuant by sweat, urine, and stool; if the dose was too large, it produced vomiting, profuse perspiration, or too copious a discharge by the kidneys, or diarrhœa, and sometimes dimness of sight, vertigo, etc. He used it frequently in nervous affections, obscure pains, and dropsy. Stearns' Am. Herb.; Mér. and de L. Dict. de M. Méd. The leaves, beat up into a poultice, are applied to painful parts, hemorrhoids, etc., and as a cataplasm in spasmodic retention of urine, and in catarrh of the bladder, no doubt producing beneficial results by its narcotic properties. Combined with bread, or bruised and applied alone, it eases headache and pain in the ears, helps inflammation of a venereal kind, pains from cancerous tumors, and is applied with advantage in herpetic, syphilitic, and scorbutic eruptions. Given internally, one half-grain infused in one ounce of boiling water may be used. See, also, Linnæus, Veg. Mat. Med. 34; Flore Méd. v, 239. It was mentioned by Dioscorides, iv, 56. By the analysis of Desfosses, the berries furnish an alkaloid called *solanine*, possessed of marked properties. Nouv. Journal de Méd. x, 67; Journal de Chim. Méd. iii, 541,

Dunal says it induces dilatation of the pupil by friction, as completely as it is accomplished by belladonna. Auc. Journal de Méd. vi, 150; Hist. Méd. des Solane, by Dunal. It has been doubted whether it produces any impression upon epileptic patients. Botanique Méd. 292. The fumes arising from the burning of the fresh fruit are valuable in curing toothache. Gazette of Health, May, 1824. The juice furnishes a reactive agent, which indicates at the same time acids and alkalies, according to S. Boullay, Bull. des Pharm. ii, 576; and in the Observs. on different English species by Bromsfield. See also Desfosses, Chem. Anal. of the narcotic principle, followed by some cases illustrating the action of that principle; Revue Méd. iv. 463. Griffith, Med. Bot. 482, says that it appears to possess the same properties as the *S. dulcamara*, but in a greater degree; accounted for by the fact that *solanina* exists in it in larger proportion. Orfila found the extract equal in power and energy to that of lactucarium. Toxicol. Gén. ii, 190. It may be employed in the same description of cases as the bittersweet. Eberle thinks it is by far too much neglected.

Solanum Carolinense, Michaux. Horse-nettle. Diffused; collected in St. John's, in pine barrens; vicinity of Charleston; Newbern. Fl. August.

Mér. and de L. Dict. de M. Méd. vi, 410. Valentine employed it in tetanus (non traumatique). The juice of five or six berries was used, augmenting the dose from day to day. See "A notice of the different methods of treating tetanus in America, with observations on the good effects of the *S. Carolinense*" (in French). Journal Gén. de Méd. xl, 13. They did not have it in sufficient quantities to repeat the experiment; with us it is abundant. It possesses some reputation among the negroes in this state as an aphrodisiac.

Solanum mammosum, Pursh. Vicinity of Charleston.

Lind. Nat. Syst. 295. The decoction of the root is bitter, and is esteemed a valuable diuretic. Ainslie, M. Med. 291;

Griffith's Med. Bot. 483. It bears a poisonous fruit, which is said to contain *malate* of *solanina.* Its extract, in small doses, has been given in cardialgia, lepra, etc. Flore Méd. Antill. iii, 159.

Solanum Virginianum, Pursh. Grows in sandy soils; vicinity of Charleston. Fl. July.

Stearns' Am. Herbal, 154. The leaves are anodyne; the juice of the whole plant is sharp and corrosive, and inspissated in the sun to the consistence of an ointment, is applied to cancers and ulcers. "The plant is good in rheumatic affections, and in those proceeding from venereal taint—surpassing opium." It has also been found serviceable in itch and herpes. From this statement, it appears to resemble in its properties the *S. nigrum.*

Solanum tuberosum. Cult. Irish potato. It is said to have been originally carried to Europe from Virginia. Baldwin found it growing wild in Peru.

Dém. Élém. de Bot. ii, 142. The juice of the leaves is said to be an excellent diuretic. "Nous avons remarqué que les enfans de nos provinces, nourris avec ces racines, ont le ventre gros, dur, et sont sujets à des glandes tuméfiées!" Lind. Nat. Syst. Bot. 295, where it is mentioned that the root, in a state of putrefaction, is affirmed to give out a light sufficient to read by. Macculloch said potash could not be obtained from the stalks, though it exists largely in the plant. Griffith's Med. Bot. 483. An extract of the leaves is highly spoken of by Mr. Dyer in chronic rheumatism, and in painful affections of the stomach and bowels: he thinks it ranks between conium and belladonna. Pharm. Journal, i, 590.

The Irish as well as the sweet potato, rice, etc., contain starch in large amount, and it is easily obtained. See "*Maranta*," arrow-root, in this volume.

The following is a method of cleaning silks with potatoes: three Irish potatoes are pared into thin slices, and well washed; pour on them a half-pint of boiling water, and

add to it an equal quantity of alcohol; sponge the silk on the right side, and when half-dry iron it on the wrong side. The most delicate colored silks may be cleansed by this process, which is equally applicable to cloth, velvet, or crape.

Solanum lycopersicum. Ex. Cult. Tomato.

The fruit of this plant is well known as an article of food; it is slightly acid, and has a constipating effect, which renders it so appropriate as an article of food during the warm months of summer. The leaves are said to produce vomiting, from an alkaline principle which exists in them; they also contain calcareous sulphates, extractive, and a coloring matter, combined with a volatile oil. See analysis in Journal de Pharm. xviii, 106; Griffith's Med. Bot. 483. The alkaloid principle contained in the leaves is analogous to, if not identical with *solanina.* A peculiar oil and an animalized extractive are also ascribed to it by other observers. Journal Phil. Coll. Pharm. iv, 224. The fruit contains a peculiar acid, and a brown, tarry, odorous, resinous matter, with some indications of the presence of an alkaloid. It is said to act on the biliary functions.

Tomatoes may be preserved for winter use in a portable form suitable for distribution to soldiers in camp as well as for families in the following manner: mash the fruit, strain the juice through a coarse towel, season with salt, boil in a pewter or tin vessel until one-third is evaporated; then spread on a flat surface and expose to the sun till it looks like a paste. When ready to store away put writing paper over the paste, wet in vinegar. This is a plan used by the ladies in South Carolina. The watery parts are all evaporated, and a small portion is enough to season soup, broths, etc. The economical value of the plant is well known. The seeds are irritant to the mucous coat of the digestive organs, but the laxative effect is corrected by the juice, which darkens the excreta as if a salt of iron had been taken. The use of the fruit tends to promote constipation and prevent diarrhœa.

Physalis pubescens. Grows in sandy soils; collected in St. John's. Fl. July.

Mér. and de L. Dict. de M. Méd. v, 296; Journal de Chim. Méd. vi, 210. It is supposed that the species bearing this name in Europe and America are different. The former is interesting.

Physalis viscosa, L.
" *obscura*, Mich.
" *pubescens*, W. } Ground-cherry. Diffused; grows along roads; collected in St. John's, Berkley; vicinity of Charleston. Fl. Aug.

This is said by Clayton to be actively diuretic.

Atropa physaloides. Grows around buildings; in rich soils. Fl. Aug.

This plant would probably be found upon examination to be possessed of some medicinal qualities.

Nicotiana tabacum, W. Tobacco. Introduced.

This plant grows in South Carolina and Georgia. In the lower portions of the latter state it is planted as an article of trade. Its properties are well known. See authors.

Tobacco should be more extensively cultivated for home use, particularly for the comfort of our negroes in Carolina, Georgia, and Alabama. I have seen it springing up, and bearing abundantly near Stateburg, South Carolina; it was flourishing without culture. Consult Johnson's Chemistry of Common Life, vol. ii, p. 32, for an interesting account of tobacco; the papers in the Lancet during the controversy on the subject of the use of tobacco; also the British and Foreign Med. Chirug. Review. In the manufacture of *Killickinick* tobacco in Virginia they add sumach leaves, which lessens the strength. See a paper on the "Cultivation of Cuba Tobacco," by J. M. Hernandez, of St. Augustine, Florida, in Patent Office Reports, 1854, p. 212; the best mode of preparing it is also treated of. The ashes of tobacco contain a large proportion of potash. The residuum of ash after burning is very great, as any

one can observe by noticing what remains when a cigar is consumed. The plant also yields ammoniacal salts. A full account of the amount of tobacco produced in the several states, and of the culture and mode of preparation may be found in the Farmer's Encyc. from the Farm Register.

Datura stramonium. Linn. Jamestown weed; thorn-apple; stramonium. Diffused; grows abundantly in upper and lower districts; Newbern. Fl. July.

Trous. et Pid. Traité de Thérap. et de M. Méd. i, 230; Orfila, Traité de Toxicol. Journ. Univ. des Sci. Méd. 47, 227; Ell. Bot. 276; Drayton's View, 63; Edin. Med. and Surg. Journal vii and viii, 1812; Trans. Med. Chirurg. Soc. Edin. i, 285; Archives Générales de Méd. iv, 373; Méd. Chirurg. Trans. Lond. vii, ann. 1806; Bell's Pract. Dict. 434; Eberle, Mat. Med. ii, 80; Ed. and Vav. Mat. Méd. 438; Pe. Mat. Med. and Therap. ii, 308; Frost's Elems. Mat. Med. 460; U. S. Disp. 688; Watson's Pract. Physic, 197; De Cand. Phys. Veg. i, 354; Bayle, Bill. Therap. ii; Big. Am. Med. Bot. i, 17; Woodv. Med. Bot. 74, 197; Traité de Chimie, 81, 319; Paris's Pharm.; Bart. Essay Form. Mat. Med. 48; New England Med. and Surg. Journ. iv, 226; Med. Chirurg. Trans. vii, 2; Ball. and Gar. Mat. Med. 346; Cullen, Mat. Med. ii, 281; Bergii, Mat. Med. i, 122; Mér. and de L. Dict. de M. Méd. ii, 593; Bull. des Sci. Méd. de Férus, xi, 197; Lindenstolpe, de Venenis, 531, *op. cit.;* Sauvage, Nosol. ii, 430; Greding, in Ludwig's Adversaria, i, 345; Murray's Apparat. Med. i, 670; Fowler, in Med. Comment. v, 161; Adhelius, cit. in Med. Com. Phil. Trans. Abridg. vi, 53; Rush, in Phil. Trans. i, 384; Schœpf, Mat. Med. 25; Wedinburg, Med. Comment. iii, 18; Beverly's Hist. Virginia, 121; Med. and Phys. Journal, xxv, xxvi; Cooper, in Caldwell's Thesis, vol. i; Shec. Flora Carol. 497; New York. Med. Repos. ii, 27; Lind. Nat. Syst. Bot. 294.

A well-known narcotic and antispasmodic, employed in mania, epilepsy, chorea, tetanus, and palsy.

Bergius frequently saw maniacs restored to perfect sane-

ness of mind, which they never afterward lost, by the continued use of the extract of our common *stramonium*; and by the same means he effectually cured the delirium so often attendant upon childbirth, where every other remedy had proved abortive. Bull. des Plantes Vén. et Suspect. de France, i, 38; Dém. Élém. de Bot. ii, 75; Milne, Ind. Bot. 285. Adhelius states that of fourteen patients who suffered under epilepsy and nervous affections in a hospital at Stockholm, eight were completely cured, five relieved, and only one received no benefit. Thornton's Fam. Herb. 188; Woodv. Med. Bot. ii, 339; Storck, i, c. 5; Kames in Comm. Nov. 1733, p. 251; Lobsten, Epistle ad Gurren, Plantes Vén. Alsat. Eph. Nat. Cur. cent. ix, obs. 94; Huckel in Comm. Nov. 1744, 14; Barrex, Essai sur l'Hist. Nat. de la France, 48; Buchner, Misc. Phys. Mat. 122. The seeds are soporific, and are said to induce delirium and a partial forgetfulness, and to be used by women in the East for purposes herein stated, viz: "*Ab India alia inebriantia et aromatica in electuarium recipitur semen, ad grata phantasmata cienda, et, ut quidem volunt, quo ad celera patranda, tanto audaciores evadant.*" Kæmpher, Exotic, 650. "*Somnum facit adeo profundum ut impune pudicitia puellæ violari possit, quæ hoc toxicum sumserit.*" Haller, t. c. "*A mulieribus infidis Turcis gynecæis inclusis, ad consopiendos et dementandos maritos, quo aliorum majis desideratorum amplexibus satientur, usurpari, et Hamburgi a vetula sic honestam feminam, quo se inscia mœchum admitteret, intoxicatam narratur.*" See Lindenstolpe, de Venenis, 531; Mér. and de L. Supplem. to Dict. de M. Méd. 238, 1846. Dr. Begbie has given the extract with great success, in doses of one-quarter to one-half grain every four hours, in many cases of neuralgia. Revue Méd. iii, 57, and iv, 414. Dr. Fott relates the case of a young lady who was cured in six weeks of tic douloureux by using eight to fifteen drachms of the tincture. Gazette de Santé, Janvier, 1830, p. 8; Emploi du Stramonium dans l'Asthme Nerveux, Paris, 1835. Series of observations in relation to the use of the dried leaves as a purgative in the treatment of asthma (in

French). Bull. de Thérap. vi, 12, 336. Ducros' Observations on the efficacy of the leaves of *Dat. stramonium* in a case of angina pectoris, from the Bull. de Thérap. vii, 93. Serres' Observations on the employment of extract of Stramonium in facial Neuralgia. Bull. de Thérap. xiv, 51. F. Moreau, Mém. on treatment of Hallucination by Stramonium, in Gazette Médicale, 373, 1841; see, also, Bibliothèque de Thérap. by M. Bayle, ii, 249. Lindley, in his Natural System, says it is more particularly applicable in "mania without fever." The remedies for poisoning by this plant are a speedy emetic, the free use of vegetable acids, strong coffee, etc. Dr. Fisher, President of the Massachusetts Medical Society, found stramonium useful, remarks Bigelow, in those cases of epilepsy which are diurnal or have regular returns. It was unsuccessful in those which did not observe any regular period. In tic douloureux of long standing it is advised that it be taken in large doses, and that the system be kept under its influence. The leaf, prepared and smoked as tobacco, has been found to act as a palliative in asthma; the root being less useful in this respect. From the observations of Dr. Marcet, Phys. Guy's Hosp., taken internally it had proved very effectual in removing acute pains, as in those arising from chronic diseases, acute uterine affections, for instance. Decided benefit was obtained from it in four cases of sciatica, and in two others complicated with syphilitic pains. Eberle used it in this disease with entire success; and he states that his trials with it in rheumatism were exceedingly flattering. Dr. Chapman administered it in dysmenorrhœa. The employment of the ointment in allaying pain was known as far back as the time of Gerarde, 1597 It is efficacious in changing the condition and promoting cicatrization; acetate of lead being employed with the ointment as an application to painful and irritable ulcers and hemorrhoidal tumors. Preparations of *stramonium* applied to the eye, it is well known, diminish sensibility and dilate the pupil. I have seen the extract employed to a large extent in the New York Eye Infirm-

ary, in which institution it has entirely taken the place of belladonna as an application for dilating the pupil. Its virtues reside in an extractive principle, which is dissolved by water. The powder should be kept in closely stopped bottles; the juice may be pressed out of the leaves with a bag. The ointment may be made with a pound of the fresh leaves simmered in three of lard until the leaves become crisp, then strained, and cooled gradually. Griffith, Med. Bot. 461. Its peculiar properties depend upon a principle called *daturia*, very analogous to *hyoscyamia*, slowly dilating the pupil and exercising a poisonous influence. Mr. Morries, in Ed. Med. and Surg. Journal, xxxix, 379, has described an empyreumatic oil obtained from it, closely allied to that from the foxglove. *Stramonium* is stated to be an acro-narcotic, very similar to belladonna, but acting in a more marked manner upon the secretory functions. Chapman says it is considered useful rather in allaying the excessive mobility of the system than in tending to the absolute cure of the complaint; referring to its effects in mania and epilepsy. Dr. Marcet regards its operation on the bowels as relaxing rather than astringent. The ointment has been recommended in nymphomania, to lessen venereal excitement. The dose of the powdered leaves is one grain, of the seeds half a grain; of the extract of the seeds one-quarter of a grain, from the leaves one grain; of the tincture ten drops, to be increased if necessary. The tincture is made with four ounces of the bruised seed to two pints of diluted alcohol—macerate for fourteen days. In dilating the pupil with the extract, preliminary to an examination of a diseased eye by the catoptric test, I have repeatedly found it to allay supra-orbital pains. To relieve the latter, so often a distressing concomitant, we frequently prescribe it, with equal parts of mercurial ointment and thirty grains of mur. morphiæ, as a local application. The plant while young and tender is readily collected and eaten as a salad by soldiers in camp.

Datura tatula, L. Purple thorn-apple. Grows around Charleston. Fl. July and September.

U. S. Disp. 690. "It possesses very much the same properties as the *D. stramonium.*" Mér. and de L. Dict. de M. Méd. 599. The decoction of the leaves is employed in leprosy. Dict. des Drogues, ii, 56. Said to be aphrodisiac.

GENTIANACEÆ. (*The Gentian Tribe.*)

Characterized by intense bitterness.

Gentiana Elliottii, Chap. Fl. } Sampson's snakeroot.
" *Catesbœi*, Ell. } Damp soils along rivulets; collected in St. John's; vicinity of Charleston; grows in Georgia also; Newbern. Fl. September.

Big. Am. Med. Bot. ii, 138; U. S. Disp. 348; Bell's Pract. Dict. 218; Mér. and de L. Dict. de M. Méd. iii, 361; Coxe, Am. Disp. 304; Frost's Elems. Mat. Med. 359; Griffith, Med. Bot. 461. An excellent bitter tonic, "little inferior to the European gentian," introduced to notice by Dr. McBride, of St. John's, Berkley, South Carolina. It is frequently prescribed with advantage in pneumonia attended with typhoid symptoms, and in dyspepsia. The virtues reside in a bitter extractive principle, soluble in water and alcohol. It may be advantageously combined with chalybeates. It is employed to some extent in popular practice in this state, and is found of much service as a substitute for bitters. The decoction is the form prescribed in pneumonia. The saturated spirituous tincture is advised in dyspepsia and in debility of stomach, in doses of one-quarter to one-half of a fluidounce. The root is officinal; dose of the powder from fifteen to thirty grains. The compound infusion is made with one-half ounce of the root, orange peel and coriander each one drachm, cold water twelve fluidounces, macerate for twelve hours; dose, one fluidounce. Dose of extract, ten to thirty grains. Given before meals it invigorates the stomach, increases the appetite, and prevents acidification of the food.

For extraction of "bitter principle" in plants, see Rural Cyc. 435, vol. i. It is believed by many that the use of bit-

ters in spring and autumn will counteract the action of malaria. They certainly prevent debility, and increase the digestive and nutritive powers, and thus indirectly act as prophylactics, even when they possess no positive virtue as antiperiodic agents. The various species of gentian, thoroughwort, *sabbatia*, dogwood, poplar bark, willow, pipsissewa, or winter-green, wild cherry bark, *sarracenia*, etc., supply useful bitters. They may be collected and prepared by any one. Cold water extracts bitters, and alcohol may also be added to preserve the infusion.

Gentiana purpurea, *rubra*, and *lutea* are used in England as substitutes for hops. No doubt our species would serve the same purpose; at any rate, they will give a bitter tonic property when used in the manufacture of ale, beer, etc.

Gentiana ochroleuca, W. Grows in damp soils; collected in St. John's; vicinity of Charleston. Fl. September.

Ell. Bot. Med. Notes, 340. It possesses properties somewhat similar to the above.

Gentiana saponaria, L.
G. catesbæi, Walt. } Vicinity of Charleston.
Griffith, Med. Bot. 461.

Gentiana quinqueflora, Frl. This and the *G. sap.* are esteemed fully equal to the imported gentian. In large doses they are said to be laxative!

Sabbatia angularis, Pursh.
Chironia, Linn. } Am. centaury. Grows in low soils along rivulets; collected in St. John's, Berkley; vicinity of Charleston.

Ell. Bot. Med. Notes, i, 385; Chap. Therap. and Mat. Med. 438; ii, 417; U. S. Disp. 611; Pe. Mat. Med. and Therap. ii, 344; Royle, Mat. Med. 475; Eberle, Mat. Med. i, 307. See Chironia, Big. Am. Med. Bot. iii, 147; Bart. M. Bot. 1255; Ed. and Vav. Mat. Méd. 1176; Barton's Collec. i, 15; Lind. Nat. Syst. Bot. 297; Griffith's Med. Bot. 459; Frost's Elems. Mat. Med. 529. "This is a pure

bitter, with tonic and stomachic properties." Bigelow does not hesitate to attest its utility; and Eberle considers it one of the most valuable of our indigenous remedies of this class; employed in domestic practice in intermittent fever, but principally to invigorate the stomach and alimentary canal. Barton says it was given with success in certain stages of the yellow fever. The cold infusion of one ounce of the herb to one pint of boiling water, taken in doses of a wineglassful every two hours, may be used, or thirty grains to sixty grains of the powder, which also acts as a vermifuge. The decoction, extract, and tincture may be used.

Sabbatia stellaris, Ph. (Prodrom.) }
" *gracilis*, Mich. Ell. Sk. } Grows in damp soils; Newbern; vicinity of Charleston; collected in St. John's; sent to me from Abbeville by Mr. Reed. It possesses properties similar to the above.

Frasera Carolinensis, Walt. }
" *Walteri*, Mich. } Am. colombo. Found in Fairfield and Abbeville districts; Newbern.

Ell. Bot. McBride's Note, i, 205; Drake's Cincinnati, 86; Bart. Veg. Mat. Med. iii, 107; Raf. Med. Fl. i, 196; Coxe, Am. Disp. 297; Frost's Elems. Mat. Med. 534; Mér. and de L. Dict. de M. Méd. iii, 291; Griffith's Med. Bot. 463. "A pure, powerful, and excellent bitter, destitute of aroma." Lind. Nat. Syst. Bot. In the recent state it is said to possess considerable emetic and cathartic power; the root is employed as a tonic and febrifuge, and is substituted for the officinal colombo with equal advantage, given during the convalescence from fevers. By the analysis of Mr. Douglas, Am. Journal Pharm. vi, 157, it contains bitter extractive, gum, tannin, gallic acid, resin, fatty matter, sugar, etc. Griffith, in Journal Phil. Coll. Pharm. iii, 269. In the recent state it is employed as a substitute for rhubarb, in doses of thirty grains to one drachm of the infusion of one ounce of the root to one pint of boiling

water, of which a wineglassful may be taken three times a day. It should be collected in the autumn of the second or spring of the third year. The root before being dried should be cut in transverse slices. An infusion is made with one ounce of the bruised root to one pint of boiling water; dose, one or two fluidounces. It is also useful prescribed as a tonic. This plant holds a deservedly high rank among our native tonics, and I would recommend its employment to those residing in localities where it may be found. The tincture is given as a tonic, and the powdered plant applied externally to ulcers in the form of a poultice for its antiseptic powers.

SPIGELIACEÆ. (*The Wormseed Tribe.*)

Spigelia Marylandica, Walter. Pink-root. Abundant in the lower portions of South Carolina; collected in St. John's; vicinity of Charleston. Fl. May

Lining, Essays and Obs. Phys. Lit. South Carolina, i, 386; Garden's Essay Phys. and Lit. iii, 145; Ell. Bot. Med. Notes, 237; Eberle, Mat. Med. ii, 377; Chalmers on the Weather and Diseases of South Carolina, i, 67; Frost's Elems. Mat. Med. 187: Le. Mat. Med. ii, 377; Big. Am. Med. Bot. i, 142; Home, Chim. Exper. 420; Murray's App. Med. i, 548; Royle, Mat. Med. 469; Thompson's Inaug. Diss. Fenella, Journal de Pharm. ix, 197; Griffith, Phil. Journal Pharm. 1833; Bell's Pract. Dict. 433; Ed. and Vav. Mat. Méd. 595; Pe. Mat. Med. and Therap. ii, 344; U. S. Disp. 680; Ball. and Gar. Mat. Med. 334; Bergii, Mat. Med. i, 96; Mér. and de L. Dict. de M. Méd. vi, 502; Coxe, Am. Disp. 128 and 558; Bull. des Sci. Méd. de Férus, xi, 301; Lind. Nat. Syst. Bot. 299; Bart. Am. Med. Bot. ii, 80; Woodv. Med. Bot. ii, 289. See Dr. Brocklesby's Obs. Med. 282; Griffith's Med. Bot. 466. This plant is a well-known indigenous anthelmintic, possessed of narcotic and cathartic powers. Dr. Barton found it also useful in the fevers of children not proceeding from verminous irritation, as from those, for instance, consequent upon hydrocephalus. The root contains a heavy, gross, and volatile oil, a small quantity of resin, a

peculiar bitter substance, *spigeline*, albumen, gallic acid, salts, etc. See Anal. Journal de Pharm. ix, 197 According to Feneuille, *spigeline* is bitter, nauseant, and purgative, and produces a sort of intoxication (ivresse). The root is much more active in the recent state. With senna, it forms the well-known and efficacious remedy called worm-tea: composed of spig. half an ounce; senna two drachms; savin half a drachm, and manna two drachms—to be infused in a pint of water and strained, of which one to two ounces may be given to a child. This dose does not excite narcotic symptoms. Chalmers' Hist. of South Carolina. Dr. Lining, of South Carolina, gave twelve grains of the root of this plant to an infant morning and evening; ten to twenty grains may be given to one of seven, and one drachm to an adult, repeated two or three times a day; or an ounce of the root infused in one pint of water, of which a half may be taken by an adult, and one or two spoonfuls by a child. When a full dose is given at night, it is well to follow it by a purge in the morning. Dr. J. P Thomas informs me that his children drink the pink-root tea habitually as a beverage, and prefer it to the hyson; and in this way it proves prophylactic against worms.

Apocynaceæ.

It contains species with purgative, acrid, and febrifugal properties.

Forsteronia difformis, D. C. (Prodrom.)
Echites " Walter, and Ell. Sk. } A vine; found sparingly in South Carolina; collected in St. John's, Berkley, on Sarrazin Pl. (Mrs. I. S. Porcher's); found also in the vicinity of Charleston.

Mér. and de L. Dict. de M. Méd. iii, 51. With milk, it is used as a wash for freckles. The juice is said to be sufficiently caustic to destroy warts and scirrhous excrescences. Any portion of the plant will coagulate milk.

The juice of our species of *Echites* and *Forsteronia* (*E. difformis*, Ell. and Walt.) should be examined, for from this

genus is obtained the highly poisonous *Woorari* (from *E. suberecta*) growing in Jamaica.

Apocynum cannabinum, L. } Indian hemp; dog's-bane;
A. pubescens, Ell. Sk. } old Amy-root; grows along fences in wet soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Bell's Pract. Dict. 61; Pe. Mat. Med. and Therap. ii, 365; Journal Phil. Coll. Pharm. v, 136; Am. Journal Med. Sci. xii, 55; Dr. Griscom, in *op. cit.;* U. S. Disp. 108; Am. Med. Rev. iii, 197; Ball. and Gar. Mat. Med. 338; Mér. and de L. Dict. de M. Méd. i, 368. This is a powerful emeto-cathartic, producing diaphoresis, and expectoration, inducing also a tendency to sleep, independent of the exhaustion consequent upon vomiting. The evacuations brought on by it are large, feculent, and watery; and they are succeeded by perspiration. Am. Journal Med. Sci. *loc. cit:* "It diminishes the frequency of the pulse, and induces drowsiness." This plant is one of our most powerful hydragogue cathartics and diuretics, and has frequently cured aggravated cases of ascites. It acts so decidedly in draining the system that Dr. Rush called it the "vegetable trocar." We have seen it used with advantage in dropsy by Dr. V Mott among his clinical patients; he employs it in all cases of tonic dropsy, being too active for those of an atonic character, where iron would have been advisable. Dr. Knapp states, in his Inaug. Thesis, that fifteen to twenty grains of the powdered root would induce vomiting; he gave it in intermittent fever, in pneumonic affections, in dysentery, and as an alterative in enteritis. It acts as a sternutatory, and the fresh juice has been employed as an external application in some cutaneous affections. By chemical analysis, it is shown to contain tannin, gallic acid, gum-resin, wax, fecula, and a bitter principle, *apocyne.* Mérat states, in the Supplem. to the Dict. de M. Méd. 52, 1846, that the preparation called *apocyne* combines all its valuable constituents. Revue Méd. Oct. 1833, and Journal de Chim. Méd. x, 95 et 567; see, also, Griffith, Med. Bot. 449. The decoction, made with one

ounce of the root in one pint of boiling water, is given in doses of a wineglassful three times a day. The bark furnishes a fibre resembling hemp, of a whiter color, and superior in durability; and the decoction affords a permanent dye, brown or black, according to the mordant used. It is given to some extent in domestic practice in the lower portions of this state, and is called by the negroes "General Marion's weed," from its having been a favorite remedial agent in the camp of the partisan leader.

"This plant has been proved by Prof. Thouin, of Paris, to possess a stronger fibre than that of hemp; and it is used by the American Indians for making cordage, fishing nets, and coarse cloth. The name alludes to the noxiousness of the juice to dogs." Rural Cyc. See *Urtica*, *Linum*, *Asclepias*, for plants containing textile fibres. We have also *A. androsæmifolium*. In St. John's, Berkley, S. C., this plant is known as "Amy root," and is esteemed to possess great virtues in arresting intermittent fevers—used as a substitute for quinine. It is generally given steeped in whiskey, or a decoction may be drunk as a tea. I am told by residents that the plant is also purgative, and it affords a singular example of a bitter and a purgative united, hence its applicability as a stomachic in constipation, dyspepsia, and depraved conditions of the nutritive organs. A subject of violent asthma assures me that the decoction gives her more relief than any other agent tried, possibly by promoting digestion. See next species.

Apocynum androsæmifolium, L. Dog's-bane. Grows in damp, rich soils; vicinity of Charleston.

Big. Am. Med. Bot. ii, 148; Mér. and de L. Dict. de M. Méd. i, 368; Coxe, Am. Disp. 85; Kalm's Travels, 326; Griffith, Med. Bot. 450. Thirty grains of the powder of the recently dried root is emetic and diaphoretic, causing scarcely any previous nausea; so that it is suitable for evacuating the contents of the stomach without producing exhaustion or relaxation of the muscular system. It operates in this way as effectually as two-thirds of the quantity

of ipecacuanha. The active property is diminished by keeping. As a diaphoretic, it is best combined with one grain of opium. Dr. Zollickoffer considers it a useful tonic in doses of ten to twenty grains. The Indians use it in lues venerea. Mér. and de L. Dict. de M. Méd. It is also employed by the vegetable practitioners. See Howard's Imp. Syst. Bot. Med. 291. It is supposed to contain a bitter extractive principle, a coloring principle, soluble in water, caoutchouc, and a volatile oil. The wounded plant emits a copious milky juice.

The properties mentioned above closely resemble those ascribed to the "Amy root" (*A. cannabiñum*) by residents of St. John's, South Carolina, viz: a laxative united with a bitter principle.

ASCLEPIADACEÆ.

Roots generally acrid and stimulating. Some of them emetic.

Gonolobus macrophyllus, Mich. Variety *a* and *b*. Collected in St. John's, Berkley; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, i, 328; Mér. and de L. Dict. de M. Méd. iii, 409; Ann. du Muséum, xiv, 464. It is one of the substitutes for colocynth. Mérat says: "Cette apocynée des États Unis passe pour fournir le suc avec lequel les sauvages de ce pays empoisonnent leurs flèches."

Asclepias tuberosa, W } Pleurisy root, but-
" *decumbens*, of some Bot. } terfly-weed. Grows abundantly in pine barrens; collected in St. John's; Newbern. Fl. July.

U. S. Disp. 127; Pe. Mat. Med. and Therap. ii, 347; Chap. Therap. and Mat. Med. i, 351; Ed. and Vav. Mat. Méd. 345; Eberle, Mat. Med. ii, 219; Ell. Bot. Med. Notes, i, 326; Big. Am. Med. Bot. ii, 65; Thacher's U. S. Disp., art. *A. tuberosa*; Bart. M. Bot. i, 244; Lind. Nat. Syst. Bot. 304; Am. Med. Record, iii, 334; Frost's Elems. Mat.

Med. 217; Bell's Pract. Dict. 82; Cullen, Mat. Med. i, 6; Mér. and de L. Dict. de M. Méd. i, 467; De Cand. Prodromus, 458; Shec. Flora Carol. 220; Barton's Collec. 48; Lind. Nat. Syst. Bot. 304. This plant is actively diaphoretic and expectorant, without being stimulant. "It has the singular property of exciting general perspiration without increasing in any perceptible degree the heat of the body." (Lindley, see *A. decumbens.*) In large doses it is purgative. It has been advantageously used in rheumatism, in most pectoral affections, catarrh, subacute pneumonia, and in phthisis, as a palliative. It has also been favorably employed in dysentery. Shecut says that thirty grains of the powdered root at a dose was much esteemed in this disease. Dr. McBride, of St. John's, Berkley, South Carolina, experimented largely with it in pleurisy, generally finding it to act with advantage. Eberle used it; and Dr. Parker employed it for twenty years with continued confidence. In a communication from Dr. John Douglass, of Chester district, South Carolina, we have the results of the experiments of Mr. McKeown, who believes it expectorant, tonic, diaphoretic, and sudorific; and who has employed it with benefit in pectoral affections; he considers that a teaspoonful of the powdered root in hot water, often repeated, acts as a safe and useful substitute for the preparations of antimony; he has also observed that the same quantity of the root, with half the amount of snakeroot (*Aristoloch serp.*), given several times a day for several days will induce soreness of the mouth, with free and copious salivation; this soon subsides, without any of those disagreeable results which follow the administration of the mercurial preparations. Should this effect be constant, it might be made of great service. The powdered root has been employed as an escharotic, for restraining the growth of fungous flesh in ulcers. When the diaphoretic effect is desired the decoction of one ounce of the root to one quart of water is best, given in doses of a teacupful every two hours. Dose of powdered root, twenty grains to one drachm several times a day.

In the neighborhood of Camden, South Carolina, the root of silk-weed (pleurisy root) is much relied on in rheumatism. The root is macerated in brandy. It is believed by many that it has a marked influence in promoting the excretion of bile, and the tincture is said by those who use it to have a laxative effect. It is used as a substitute for calomel. This testimony, recently obtained (1862), will be found to correspond with what was written by me long since of the pleurisy root (*A. tuberosa*), in my report on Med. Bot. S. C. 1849.

From a work reputed to contain the practice of physic among the Cherokee Indians, entitled the "Indian Guide to Health," I quote the following, which adds little to our previous knowledge: "Few articles in the Indian materia medica maintain a higher standing than pleurisy root. It acts as a mild purgative on the bowels, but it is more particularly and inestimably valuable in producing expectoration, or throwing off mucus from the throat and lungs, and in causing perspiration or sweating when other remedies fail. This root possesses one remarkable power—given in proper quantities it affects the skin and produces perspiration without heating the body or increasing circulation. It is a valuable article in diseases of the lungs generally. Its use in a strong decoction often gives relief to pain in the chest, stomach, and intestines, by promoting perspiration and assisting digestion."

The milky juice exuding from *Asclepias*, *Leontodon*, *Lactuca*, and the *Euphorbiaceæ* yield caoutchouc. I would suppose that the queen's delight (*Stillingia*), which is abundant, would also furnish it. It might be procured from those which give a large exudation of milk when cut. I have collected and dried the juice of *Asclepias*. "When any of these plants are incised there exudes a milky juice which by exposure to the air gradually lets fall concrete caoutchouc. The juice is pale yellow, thick, and similar to cream. When spread in thin layers on a solid body it soon becomes solid caoutchouc, amounting to forty-five per cent. of the weight of juice. The black color is owing to

the method of drying it after it has been spread upon moulds." Wilson's Rural Cyc., art. "Caoutchouc." Ure's Dict. of Arts contains full descriptions of processes, adaptability, etc. Caoutchouc is insoluble in water, alcohol, acids, or alkalies. By long boiling in water it softens and swells up. It is slightly soluble in ether.

The downy substance attached to the seed of the silkweeds may be used for many purposes—for stuffing beds, cushions, etc.

Asclepias incarnata, W "Grows in the valleys among the mountains of South Carolina," Elliott; vicinity of Charleston, Bach.; Newbern. Fl. July.

U S. Disp. 126; Journal Phil. Coll. Pharm. iv, 283; Griffith, Med. Bot. 455. Dr. Griffith speaks of it as a useful emetic and cathartic; and Dr. Tully says it may be given advantageously in asthma, catarrh, and syphilis; no doubt very similar in properties to the *A. decumbens.*

Asclepias verticillata, L. Dwarf milk-weed. Collected in St. John's, Berkley; Newbern.

This is a domestic remedy in repute for the bite of snakes. It is said by those who have used it in the upper districts of South Carolina to be very deservedly celebrated. These plants emit a milky juice when bruised; with the aigrette of the seeds, a fleecy down one or two inches in length, somewhat resembling silk, it has been proposed to make cloth.

Asclepias cornuti. Decaisne. } Virginian swallow-wort;
A. syriaca, L. } Virginian silk. Fields and roadsides; Newbern. Chap., and Croom's Cat.

The flowers are highly fragrant, especially in the morning and the evening, and "are gathered in their native country while the dew is on them, for the purpose of making sugar. The young shoots in spring are a very good substitute for asparagus; the down of the pods serves well for stuffing pillows and cushions, for making thread

and cloth, and for some other purposes; the fibrous matter of the stems is abundant in quantity, excellent in flax-like quality, and is used and highly appreciated in some parts of North America for making thread, cordage, fishing nets, and cloth. It has been successfully experimented with as an agricultural plant in France and Germany. It may be propagated either by transplanting roots in rows about two feet apart or by sowing seeds." Wilson's Rural Cyc. Many of the milk-weeds have strong fibres. The above only confirms a note in Prof. Gibbes' "Catalogue" as follows: the cortical fibres of many possess great strength, as is easily proved by the attempt to break their stems. From those of the *A. syriaca* a number of articles have lately been manufactured at Salem, Mass.—such as thread, netting, bags and purses, tapes, socks, knotting for fringes, etc. The silk from the pods forms an excellent article for stuffing cushions, pillows, mattresses, etc. Mixed with cotton it may be spun into yarn for gloves and socks. It is used in making artificial feathers and flowers. Bonnets, capes, and tippets of very handsome appearance are made by sewing the tufts in overlapping rows on cotton or silk. In Germany, in 1785, the cultivation of the *A. syriaca* was begun with six plants, and in eight years there was a plantation of thirty thousand, which yielded eight hundred pounds of silk the first crop, three hundred and fifty-five the second, and six hundred the third. In the same country a paper was made from the cortical fibres which was distinguished with difficulty from that made from rags. See Silliman's Journal, vol. xxviii, p. 380, and an article in the Horticultural Register, by Dearborn, in which he also gives an account of his mode of cultivation of the same plant for its young shoots, which he considers nearly equal to asparagus. *Loc. cit. sup.* From nearly all the species of silk-weed the down from the seeds may be collected. They abound in almost every portion of the Confederate States.

The Indian doctors use the root of the silk-weed as a diuretic decoction in gonorrhœa. The root is said to be

emetic and cathartic, and is used in dropsy. The *A. curassavica*, L. curasoa, which grows in South Florida (Chap.), is possessed of emetic and sudorific qualities.

OLEACEÆ. (*The Olive Tribe.*)

This order is said by Lindley to offer one of the few instances of oil being contained in the pericarp, it being in most other plants yielded by the seeds.

Olea Europea. European olive. Introduced.

This well-known plant, of which it has been said "*Olea prima omnium arborum est*," is cultivated in Charleston as a garden plant, and matures its fruit. A tree in Lamboll street bears fruit of good size, which I have seen made into excellent "olives" for table use; also pickled. Repeated attempts have been made to cultivate the olive, and little doubt exists that with greater efforts it may become a valuable oil-bearing plant. In Patent Office Reports, 1854, p. 28, is a brief statement of several efforts to introduce the olive into South Carolina, Georgia, and other Southern states. A paper was also published on this subject by Judge King, of Charleston. In 1755 Mr. Henry Laurens imported and planted olives, capers, limes, ginger, etc. The latter is still easily raised in our gardens in South Carolina, Georgia, and Florida. In 1785 the olive was successfully grown in South Carolina. It is not easily propagated from seeds. A colony of Greeks, settled at East Florida, had planted the olive, and sixty years ago it is said there were large trees marking the site of that settlement. The tree was also cultivated by Mr. Cooper, of St. Simons, and Mr. Spalding, of Georgia. See a paper in Southern Cultivator, p. 7, vol. iii; also Jefferson's letter to Drayton, in his Memoirs.

As this plant is an important one, and experience concerning its propagation in the Confederate States is difficult to obtain, I add the following statement of Mr. R. Chisolm, Beaufort district, S. C.:

"My olive trees were imported from the neighborhood

of Florence, by the way of Leghorn, in 1833, and consist of two kinds—the small, round, esteemed best for oil, and a much larger and more oval-fruited sort, which turns white before it becomes purple, the latter having been sent as stalks to engraft the other upon. The winter of 1834–5 was an excessively cold one, and injured to the roots all the orange trees of the South, and some of them so severely that they never afterward sprouted; yet I do not recollect that my olive trees suffered at all—certainly, none were killed. No cold which we have experienced since has ever caused them to shed a leaf, whereas our orange trees have suffered much, and about four years since barely escaped being killed to the ground. My olive trees are planted in a rather flat, clayey piece of land, quite near the salt water, and but little elevated above high tides. In Italy, I believe, it is generally thought that this tree does not thrive well far from the sea, but does best on what they call a fat soil, which contains more or less clay. From what I have seen of it on sandy soils in this vicinity it has proved not very fruitful. Finding that my trees grew very slowly, and not expecting to derive profit enough from them to pay for their culture, the idea occurred to me of trying to cultivate the sweet potato, field and cow-peas among them, hoping that the expense of cultivating the olive might be covered by these means. The land was well manured every year in June and cultivated with one or the other of these crops, in such a manner as the other operations of the plantation would render convenient, generally, however, with sweet potatoes, irrespective of rotation. The result has much more than answered my expectations, as I very seldom failed to make a fair crop of potatoes, and the trees have grown vigorously, and rapidly come into bearing, and have continued to bear good crops of fruit every year, occasionally abundant ones; while in Europe the habit of almost every variety of this tree is to bear only in alternate years. As the olive ripens during the months of October and November, at a time when we are straining every nerve to save most of our other crops,

no attempt has ever been made to gather all the fruit; but one year enough was gathered, pounded in a mortar and the oil pressed out, to justify me in saying that I produced a very clear and good looking article, which was exhibited about two years since at the Fair at the South Carolina Institute. The only use that has yet been made of the olives is to pickle them while green, in a full grown state, in August or September, for which purpose they seem admirably adapted. A few may now be found on sale, which are preferred to those imported. The recipe for pickling was obtained from France, and is as follows: 'For each pound of the fruit take a pound of strong ashes (those of the hickory wood are the best we have) and an ounce of good slacked lime; mix the lime and ashes with water until a soft paste or mortar is formed, into which stir or imbed the olives, and finish by covering the whole mass with a layer of dry ashes. Let them lie in this state until all the bitumen is extracted, which may be known by the stones slipping readily out of the pulp when squeezed between the forefinger and thumb, for which purpose a few may be tried once an hour, or oftener if desired. The length of time required for this will depend entirely upon the quality of the ashes and lime, and may vary from two to three hours to as many days. As soon as the olives have been deprived of their bitterness they must be washed clean and put to soak in fresh water, which must be changed about once an hour for twenty-four hours, when the taste of potash will have been removed and the water cease to be discolored. The olives must then be put into bottles or jars, and a strong brine put over them made from good rock or alum salt. This brine will generally require to be changed several times, in consequence of becoming ash-colored, after which the bottles must be sealed air-tight, and if kept in a cool, dry, dark place the olives will keep good for years.' Olives carefully cured after this plan will be found less salty than those pickled in France which are usually sold in this country, and will retain much of the nutty flavor of pure

olive oil. I do not think that the making of oil from the olive will be likely to prove sufficiently profitable to be pursued in this country for many years, as labor is expensive, and other crops will necessarily take the lead unless the price of labor or soil in Europe should be increased, when there will, consequently, become a greater demand."

The oil is obtained of two or three qualities. The *virgin* oil is that which spontaneously separates from the paste of crushed olives. This is purified for watchmakers by placing in a vial containing in it a slip of sheet lead. In Sicily the olives are beaten from the tree. It is allowed to ferment in bins or receptacles. It is then conveyed to a mill, ground into a paste under heavy stones, and chaff or small straw occasionally thrown in to retain the oil. The pulp is then rammed into round, flat baskets, made of a strong kind of rush, and submitted to a press. When the oil ceases to run from a first pressing, the baskets are removed, their contents again pressed under the mill, returned to the baskets, submitted to the press again. Hot water is sometimes thrown over the mass to increase the flow of oil, the latter being subsequently skimmed from the surface. What is finally left in the baskets, after the third pressure, is refuse material, used for lamps by curriers and tanners. To procure the best oil no fermentation should be used. Consult Ure's Dictionary of Arts, Patent Office Reports, 1859, p. 114.

We have the *Olea Americana* growing in the Confederate States. The fruit matures near Charleston, but not in St. John's, Berkley.

Olea Americana. Devil-wood: American olive. I have collected it near Charleston, Rutledge's farm, and at Sarrazin (Mrs. I. S. P.), St. John's, S. C. I have never seen berries except near Charleston. Rare and ornamental.

The wood has a fine and compact grain, and when perfectly dry it is excessively hard and very difficult to cut or split; hence is derived the name of devil-wood. On laying bare the cellular integuments of the bark its natural

yellow hue changes instantaneously to a deep red, and the wood, by contact with the air, assumes a rosy complexion. Michaux suggests that experiments be made to test the nature of this active principle. Am. Sylva; Farmer's Encyc.

Chionanthus Virginica, Walter. Old-man's beard; poison ash; fringe tree. A very ornamental plant; collected in the swamps of St. John's, Berkley; vicinity of Charleston; Newbern. Fl. April.

Ell. Bot. Med. Notes, i, 6. An infusion of the roots is given in long standing intermittents. It is tonic and febrifugal, with some acro-narcotic properties; used in the form of cataplasm as an application to wounds and ulcers. Griffith, Med. Bot. 44.

Fraxinus acuminata, La. M. Grows in rich swamps; St. John's; Newbern.

Ell. Bot. Med. Notes, ii, 673. The wood is light, elastic, and strong; used by carriage and cabinet makers and wheelwrights.

Fraxinus Americana, L. White ash.

In the Confederate States we have the white, red, green, blue, and water ash. Wilson says that *F. Americana* differs in few respects from the English ash, *F. excelsior*, which in England is used for every conceivable purpose by the farmer, turner, cabinet-maker, wheelwright, and for fire-wood. "The bark of the tree is used for tanning calfskins, and for dyeing green, blue, and black; the ashes of the trunk, root, or branches are comparatively rich in potash." Coal was also made from it. The leaves of the *F. Americana* "are said to be so highly offensive to the rattlesnake that that formidable reptile is never found on land where it grows; and it is the practice of hunters and others having occasion to traverse the woods in the summer months to stuff their boots or shoes with white ash leaves as a preventive of the bite of the rattlesnake."

Class II. GYMNOSPERMS.

Coniferæ or Pinaceæ. (*The Fir Tribe.*)

One of the most important orders, whether we view it in reference to its timber or its secretions.

Pinus palustris, L. } Long-leaved pine. The specific
" *australis*, Mich. } name is a misnomer, as it grows on high land. Grows along the sea-coast in the tertiary region, and within one hundred and twenty miles of the ocean. I have observed it in the lower part of Fairfield district; Newbern. Fl. May.

Bell's Pract. Dict. 359; U. S. Disp. 709; Pe. Mat. Med. ii, 167; Ball, Gar. M. Med. 309; Royle, Mat. Med. 564. This is the most valuable of the pine trees, and from it the largest amount of tar, pitch, and turpentine is obtained. The spirits of turpentine is a well-known and valuable diffusible stimulant, diuretic, and anthelmintic, in large doses acting as a laxative. It is from this species that the Boston turpentine is obtained, which enters into the composition of a soap of very superior quality. This tree shoots up into a straight shaft, devoid of branches sometimes for fifty or sixty feet; the heart is very durable, and the wood is employed for almost every purpose. It is, indeed, one of the great gifts of God to man.

The forests of pine are not only useful but beautiful. The characteristic moan of the winds through their branches, their funereal aspect, almost limitless extent, and the health-giving influences which attend their presence, all contribute to make the pine an object of peculiar interest to the people of the Southern states. The terebinthinate odor of the tree, some electrical influence of its long, spear-like leaves, a certain modification of "ozone" (an allotropic condition of oxygen, see Faraday's examinations), are severally esteemed to modify the atmosphere and diminish the effects of malaria. They also create a mechanical barrier to the ingress of malaria, and hence the

pine land residences, though contemned for their sterile aspect, have proved a blessing to the Southern planters in affording a comparatively safe refuge from the unhealthy emanations of the neighboring plantations. The seeds of the long-leaf pine are edible and nutritious, and are largely consumed by hogs.

I need not describe the processes for making tar. It is a very compound substance (see Rural Cyc.), and contains modified resin, oil of turpentine, empyreumatic oil, acetic acid, charcoal, and water, and when inspissated by boiling is converted into pitch. It is extensively used in the cordage, caulking, and sheathing of ships, to preserve them from the weather. It is of great service in many of the arts and medicinal usages connected with agriculture. I will add what Wilson states of its economical employment, as it may be made of great service on our plantations and in veterinary medicine. It serves well as a paint to coarse kinds of boarding and paling, but is improved in its use by the addition of tallow or other coarse fat. It is applied as a covering to cuts on animals and to parts affected by the fly. It serves, either alone or in combination with some fatty substance, to defend the sore or diseased feet of cattle from being further injured by wet or abrasion; when spread upon coarse cloth it is a prime covering for broken horns, and makes an excellent application to various kinds of wounds and punctures in cattle. It is given internally to horses as a remedy for cough, also as a detergent and local remedy for scaly and eruptive diseases. Rural Cyc. It is used to cover the lower surface of posts to prevent their rotting, and grain soaked in it is not eaten by birds. Tar water was formerly much used in medicine, but at present wood naphtha and pyroligneous acid, etc., are more commonly employed.

The buds of the pine or the inside barks steeped in water is a favorite domestic remedy on our plantations for colds and coughs. Bits of fat pine steeped in gin are also used. A decoction of the inside bark is given daily as a remedy in chronic diarrhœa. Pills of resin are often

employed as a simple diuretic. Resin also enters into the composition of strengthening plasters.

A preparation with rosin, to preserve leather and shoes, is recommended by Col. Macerone, in the Mechanic's Magazine, 1848. I hope it will be found useful to our soldiers and others :

A cheap and easy method to preserve the feet from wet and the boots from wear.—A pound of tallow and a half-pound of rosin are put into a pot on the fire, and when melted and mixed it is applied while hot, with a brush, to the leather previously warmed. This must be done thoroughly and repeatedly. If it is desired that the leather should receive polish, dissolve an ounce of beeswax with an ounce of turpentine, to which add a teaspoonful of lamp-black; a day or two after the leather has been treated with the tallow and rosin rub over it the wax and turpentine, but not before the fire. Tallow or any other grease becomes rancid and rots the stitching as well as the leather, but the rosin gives it an antiseptic quality which preserves the whole. Boots or shoes for the soldier, as well as for all who go much in the wet, should be so large as to admit of wearing in them cork soles—cork being a bad conductor of heat.

Wilson in his Rural Cyc., articles "Fuel" and "Charcoal," gives the best mode of preparation, including the quality and yield of several trees. See *Salix*, in this volume, for manufacture of charcoal.

Lamp-black is obtained by the turpentine manufacturers "from the combustion of the refuse of their operations in furnaces appropriated to that purpose. The smoke deposits itself on the sacking which is hung up; it is swept off and sold for common use without further preparation. The lamp-black in this state contains some oil, which is separated by being heated to redness in a close vessel." This may be easily made in our large turpentine distilleries throughout the Confederate States.

The chief consumption of charcoal is as fuel. It is also employed as a tooth powder and to purify tainted meat.

No mode of preparation for the first of these objects is at all necessary, and for the two last it must merely be reduced to a fine powder. It forms a part of all reducing fluxes. It is the basis of most black paints and varnishes. It is used to polish brass and copper, and is an excellent clarifier. It is used in farriery, in combination with linseed meal, as an antiseptic cataplasm for cracked heels and foul and fetid ulcers. Powdered charcoal must be heated to redness in a covered crucible, with an opening in the middle of the cover, and kept in that state till no flame issues out; it must then be withdrawn, allowed to cool, and then put into close vessels. Whenever either wine, vinegar, or other fluid is to be clarified it is simply to be mixed with the liquor; a froth appears at the surface, and after infiltration it is pure and colorless. Charcoal is also used as a valuable manure, fully described in Wilson's Rural Cyc. Charcoal and sand placed in the bottom of a barrel or hogshead will purify water passed through it. (See *Salix*). It is generally believed that it will prevent contagion, yellow fever, etc., if taken during the prevalence of an epidemic. It is also used as a mild mechanical laxative in dyspepsia with foul stomach. See medical authors. Its power of absorbing gases and vapors is well known.

Creosote, also a product of the pine, is obtained from "crude pyroligneous acid and the heavy portion of the oil of wood tar, sometimes called the essence of tar, and used in the preservation of meat, the flavoring of hams, and as a remedial agent for its constringing effect." It coagulates albumen. Fresh meat suspended over creosote will be preserved. Wilson's Rural Cyc.; Ure's Dict.; and medical authors. Pyroligneous acid, obtained from the pine, is used in preserving meat rapidly in lieu of the slow process of "smoking."

Vinegar and acetic acid, obtained from pyroligneous acid, is purified by converting it into acetate of soda and decomposing that salt by means of sulphuric acid. The acetic acid, after being distilled, is lowered by water, colored, and used as vinegar.

Turpentine is now one of the most universally employed of remedial agents; it is quite surprising to how great a diversity of conditions it is applicable; all these depend naturally, however, upon its natural properties. See Trousseau's "Therapeutique," Stillé's Mat. Med., and recent authors. As an external rubefacient, a stimulant, an astringent, a stimulating diuretic and laxative, it admits of frequent application. In the arts, also, and as a material in the manufacture of soap, as a resin, and for the production of light, it is equally worthy of attention. To burn turpentine in lamps it only requires purification by redistillation, and a burner which will give increased oxygen for the consumption of the large amount of carbon which it contains.

The fumes of turpentine inhaled will cause irritability of the kidney if breathed. I have been called to attend several negroes with dysuria and bloody urine from sleeping aboard a boat laden with resin and turpentine in defective barrels. "Turpentine is one of the best means of chasing away fleas whether from place or animal, and a bed of very fine shavings of some wood which abounds in turpentine is one of the easiest and most effectual means of banishing them from dogs." Wilson's Rural Cyc. See, also, "*Juglans.*" See "*Kyan*," Rural Cyc., for preservation of timber; also Boussingault's Rural Econ. and Agricult. Chemistry. Wilson states that the oil of turpentine is almost a specific for spasm in the bowels of the horse.

That variety of long-leaved pine which acquires a reddish hue from growing in certain soils, and is known by the name of red pine, is most esteemed, and in the opinion of some shipwrights is as solid and durable on the sides of vessels as the white oak, but is said to form less perfect joints at stem and stern. It is also in great request at the North for flooring boards. The long-leaved pine supplies what is known as *naval stores* both to the United States and Europe. Rural Cyc. Pyroligneous acid, obtained from the pine, is used in preserving meat rapidly in lieu of the slow process of "smoking."

Turpentine and rosin are both abundant within our limits. An excellent English "*mixture to render leather water-proof*" is made with turpentine. In the present scarcity of leather and exposure of our soldiers, I think its introduction not inappropriate. It is used by the punt-shooters in the fenny parts of England: melt together in an earthen pipkin half a pound of tallow, four ounces of hog's-lard, two ounces of turpentine, and as much beeswax; make the boots thoroughly dry and warm, and rub in the mixture well with a little tow as hot as the hand can bear, or else hold the leather over a very gentle fire till it has thoroughly imbibed the mixture. Another mixture for the same purpose, and used by fishermen, soldiers, and others, is made thus: Burgundy pitch (rosin?) and turpentine each two ounces, tallow four ounces; or half a pound of beeswax, a quarter of a pound of rosin, and a quarter of a pound of beef suet. The leather must be dry and the mixture warm. Oil of lavender also prevents leather from moulding.

To make cloth water-proof with turpentine.—In making cloth water-proof for negroes in picking cotton when the weed is wet from rains or dews, and also for tents, the following method is adopted: "To every gallon of spirits of turpentine put two and a half pounds of beeswax, boil well in a pot, remove the fire, and while it is hot put in the goods; move it about until it is well saturated, then hang it up to dry. It will require one gallon of turpentine to every eight yards of goods." It is more pliant than India-rubber.

Candle for war times, made with rosin.—"A model economical candle, sixty yards long, for use of soldiers in camp, which will burn six hours each night for six months, and all that light at a cost of a few cents, is made as follows: take one pound of beeswax, and three-fourths of a pound of rosin, melt them together, then take about four threads of slack-twisted cotton for a wick, and draw it about three times through the melted wax and rosin, and wind it in a ball; pull the end up, and you have a good candle."

A preparation of turpentine, probably turpentine redistilled, called *Terebene*, is manufactured at Camden, South Carolina, and largely used as a burning fluid since the blockade. The price is moderate; it gives a good light, but requires a modification of the old kerosene chimney. "Palmetto oil," so called, is probably pure turpentine. Prof. F. A. Porcher has used and recommends turpentine, and I have known others who have employed it for months as a burning fluid; it is not explosive. In using these highly carbonaceous agents an abundance of air must be admitted to the wick to consume the excess of carbon, which would otherwise be thrown off as smoke or deposited as lamp-black; an extra amount of oxygen is of course required to increase the combustion. *Lamp-black* is prepared from the imperfect destruction of turpentine in large burners with suitable apparatus to collect it; it may be made in the Confederate States with profit.

An economical "*soap without grease*" is made with rosin: to four gallons of strong lye add ten pounds of distilled rosin, or eight pounds of pure gum not distilled and free from trash, boil steadily until there is no rosin to be seen, and if the quantity of lye is not sufficient add more, and continue to add until the rosin disappears, boiling until it makes a brown jelly soap. This soap has been extensively made in St. John's, South Carolina, during the past year (1862), and is stated to be "equal to the best soap made with grease." I am induced to insert here the following, also, which has been successfully repeated in the country parishes of South Carolina since the blockade: *Tallow candles equal to star.*—To two pounds of tallow add one teacupful of good strong lye from wood ashes. Let it simmer over a slow fire, when a greasy scum collects on the top, which should be skimmed off and used in making soap, with which it is closely related. A pure tallow candle with a small wick may then be moulded, which is said to equal sperm candles. A little of the juice of the prickly pear or beeswax will render the tallow harder, and the wicks steeped in a little spirits of turpentine will make them burn brighter.

The following preparation of *coal tar* I append on account of its utility in camps and hospitals. Pyroligneous acid is itself a well known disinfectant:

Antiseptic Powder.—To correct the offensive odors of wounds, mix one hundred parts of calcined plaster of Paris and two parts of coal tar. Rub well together. Sprinkle this upon the wound once or twice daily. This has been fully tested for years in the Bellevue hospital.

Decoction of the leaves of the pine tree sweetened, to be freely drunk warm when going to bed at night or cold during the day, is very much used as a domestic remedy for colds and coughs. The holly root (*Ilex opaca*) chewed, and a tea made of the blade of the Indian corn, are also given for colds; the latter also in intermittent fevers, it is said with much success.

Duration of wood impregnated with sulphate of copper.—A paper upon this subject, translated from the bulletin of the Horticultural Society of the Seine, is published in the Farmer and Planter, p. 306, October, 1861. It is impregnated with sulphate of copper by M. Boucherie's process, which consists in causing a solution of the sulphate of copper to penetrate to the interior of freshly cut woods, which preserves them indefinitely from decay. All woods do not permit penetration equally. "The beech, elm, and fir readily admit all kinds of salts into their tissue. The oak impregnates completely its sap wood, while the heart of the tree absorbs absolutely nothing," so that that part of the tree which was thrown away may with this process be made useful. Sulphate of copper was found to be superior to corrosive sublimate. "The process of the injection of wood with the salts of copper is as simple as easy. For those woods intended for rods, it consists in plunging the base of a branch furnished with leaves into a tub containing the solution. The liquid ascends into the branches by the action of the leaves, and the wood is impregnated with the preservative salt. As for logs, the operation consists in cutting down the tree to be operated upon; fixing at its base a plank which is fixed by means of a screw placed in

the centre, and which can be tightened at will when placed in the centre of the tree. This plank has on the side to be applied to the bottom of the tree a rather thick shield of leather, cloth, pasteboard, or some other substance, intended to establish a space between it and the wood, sufficient for the preserving fluid to keep in contact with the freshly cut surface of the tree. The liquid is brought there from a tub or other reservoir by the help of a slanting pole made on the upper side of the tree, and in which is put a tube adapted at its other extremity to a spigot in the upper reservoir, which contains the solution. A pressure of five metres suffices, so that the instant the sap of the tree is drawn away it escapes and is replaced by the liquid saturated with sulphate of copper. As soon as the operation terminates, and it lasts for some hours for the most difficult logs, the wood can be sold and put to any use." M. Decaisne enumerates the immense advantage which this process would procure to horticulture. Boxes, frames, greenhouses, supports, etc., submitted to the deleterious action of all the exterior agents which destroy them so rapidly, all can acquire an almost indefinite duration, and thus furnish a very great economy of time and money. M. Decaisne opposes the process by simple immersion. M. Audry asserts that even cloths, curtains, etc., exposed to the weather, "last eight years after being immersed in a solution of one kilogramme of the salt to eight litres of water."

On the subject of the difference between dry and wet wood, I quote from a paper in Southern Field and Fireside on "Economy in the use of salt," by the editor. It is applicable to the present wants of the Southern Confederacy: "Last year we killed a vicious bullock in September, when the weather was hot and dry. The meat was cured with a trifle of salt, and we have some of it now, which is as sweet and good as dried beef can be. All the larger bones were cut out and partly used for making soup and partly for making soap. The rib pieces were dried with the bones in the meat, which was generally cut into slices. The drying was done over a wood-coal fire, and not over a wood fire—

a distinction worth remembering." Ashes are sometimes used a substitute for salt in curing meat.

On economy in plants, manures, etc., during non-importation of guano: "Weeds, leaves of trees, and all the succulent plants which grow so abundantly in ditches and waste lands, under hedges and by the roadside, if cut or pulled when in flower, and slightly fermented, furnish from twenty to twenty-five times more manure than straw does. These plants carefully collected furnish to the agriculturist an immense resource for enriching his lands. Besides the advantages arising from the manure furnished by these plants, the agriculturist will find his account in preventing the dissemination of their seeds, which by propagating in the fields deprive the crops of the nourishment of the soil. The turf that borders fields and highways may be made to answer the same purpose by cutting it up with all the roots and the earth adhering to them, rotting the whole in a heap and carrying the mass upon the field, or what is still better, by burning it and dressing the land with the product of the combustion." The alkaline salts are most abundant, it will be remembered, in green, herbaceous plants. M. DeSaussure has observed that the ashes of young plants that grew upon a poor soil contained at least three-fourths of their weight of alkaline salts, and that those of leaves of trees which grew from their beds contained at least one-half. The ashes of the seeds contain a greater proportion of alkaline salts than those of the plants that produced them. M. Pertuis found that the trunks of trees afford less ashes than the branches. Chaptal's Chemistry, p. 97. The scrub oak (*V catesbœi*) is said to yield ashes very rich in potash.

Pinus rigida, L. Pitch pine. Vicinity of Charleston.

U. S. Disp. 207 From the *P. palustris* and from this species tar is extracted, which contains two principles valuable in medicine, viz: *picromar* and *creosote*. It is used in chronic cough and bronchial inflammation. Tar water had great reputation at one time, and is really not devoid of

some value. The vapor also is employed in bronchial diseases, and the ointment in tinea capitis and psoriasis. The resin from these species is frequently made into pills, and taken for colds by those residing in the country—among whom also it is frequently employed with success in chronic blennorrhagia. A medical friend informs me that in one individual who took the pine gum in large quantities it produced an irritation of the urethral mucous membrane, similar to that resulting from the use of the spirit when improperly given.

Pinus nigra, Aiton. Black spruce; fir. Confined to the high ridges of the Alleghany mountains. Fl. May.

U. S. Disp. 710; Ell. Bot. ii, 641. From this species the essential oil of spruce is obtained; prepared by boiling the young branches and evaporating the decoction; it has a bitterish, astringent, acidulous taste. The tall, slender bodies of this tree are used for the spars of vessels.

Pinus strobus, L. White or Weymouth pine, northern pine. Found in the declivities of the mountains of South Carolina, in the dark, sphagnous swamps along rivulets. Fl. May.

The wood is soft, fine grained, and light, and free from turpentine. It is used for the inner work of houses, for boxes, cabinets, etc. "Preferred for the masts of vessels to all other wood."

The wood has little strength, gives a feeble hold to nails, and is liable to swell from humidity in the atmosphere; but on the other hand it is soft, light, easily wrought. In ornamental work and carving of every description the white pine is used; in fact, wherever a light wood is required. Masts are also made of it, and are exported to Liverpool, though not fully equal to those from Riga. The bowsprits and spars are made of white pine. Rural Cyc. In Eaton's Botany, a work published at the North, it is stated that "perhaps nine-tenths of the boards used in America are of this species." This, however, is incorrect,

as a large quantity of timber is obtained from our long-leaved pine.

Pinus glabra, Walter's pine. St. John's, S. C., H. W. R.; common spruce pine of our swamps.

It is comparatively light and soft, and might serve as a substitute for northern pine, so much in demand for the manufacture of the inner work of houses, cabinets, presses, cases, etc., and particularly as a light material for boxes for the transportation of merchandise. The poplar is also very light and suitable for similar purposes. The loblolly pine (*P. tæda*) is also useful for making tables, presses, etc., containing little turpentine. A decoction of the inner bark of the spruce pine acts on the skin, and is used in rheumatism, coughs, colds, etc. It is also employed as a fomentation in swellings and sprains. *Pinus inops*, which I collected at Reidville, Spartanburg, S. C., resembles somewhat our lower country spruce, and is sometimes so called. It never attains the same height.

Pinus tæda, L. Abundant along the sea-coast; collected in St. John's; grows in Georgia; Newbern. Fl. April.

Pe. Mat. Med. ii, 161; U. S. Disp. 709. This also yields turpentine. Frankincense is said to be got from this species.

Abies balsamea,
" *balsamifera, Mich.*
Pinus balsamea, Willd.
American silver fir, or Balm of Gilead tree. Grows on the summits of the mountains of South Carolina. Fl. April.

Griffith Med. Bot. 605; U. S. Disp. 710. From this elegant species the Canada balsam is obtained; receiving this name, though containing no benzoic acid. Mér. and de L. Dict. de M. Méd. v. It is used as an external application to wounds.

Abies Canadensis,
Pinus, Linn.
Hemlock spruce. Confined to the highest mountains.

Ell. Bot. ii, 641. The bark is valuable for tanning, though inferior to that of the oak.

Abies nigra, Poir. Black spruce. High mountains of North Carolina and northward.

The tops of its branches yield the best kinds of *essence of spruce* for the manufacture of spruce beer. Its young stems and the upper parts of its old stems are light, strong, and elastic, and are much used in America for the spars and topmasts of ships. Its large roots and the lower parts of its old stems are sometimes employed as substitutes for oak in making the knees and other bent parts of ships. Its timbers are exported to the West India islands and to Britain for making packing boxes, herring barrels, and other similar articles. Its resin is comparatively scarce and poor, and does not suffice for yielding turpentine or fine pitch. Wilson's R. Cyc.

Abies alba, Mx. White spruce. High mountains of North Carolina and northward.

The root fibres are macerated, stripped, and made into cordage by the North American Indians. Wilson's R. Cyc.

Thuja occidentalis, L. American arbor vitæ. Confined to the mountain districts, along streams; Fl. May.

U. S. Disp. 1301; Griffith, Med. Bot. 609. The leaves and twigs have a balsamic odor; the decoction was used in intermittent fevers, and, according to Schœpf, in cough, scurvy, and rheumatism; Boerhaave employed the distilled water in dropsy. The leaves are said to form an excellent irritating ointment, which has proved useful in rheumatism; and the oil has been given with success as a vermifuge. The wood is said by Michaux to be the most durable which our forests produce; fences for enclosures, rail posts, etc., are made of it. Said to be indigenous, and to grow abundantly on the banks of the Hudson; "rocky banks on mountains of Carolina." Chapman. Prof. L.

R. Gibbes expresses to me his doubts of its being found in the mountains of Carolina.

"It makes the finest ornamental hedge known to the climate. It requires pruning every year, attains any required height, and is very compact and beautiful." A writer, B. F Maurice, of Kings county, N. Y (in Patent Office Reports, 1855, p. 316, see papers on "live fences"), states that he has hedges from two to fourteen years growth, from one to ten feet high, that will compare favorably with any in this country or in England. It is easily and readily cultivated by layers. If the hedge is for ornament, considerable care is required in trimming. A hedge should be pruned every year. See, also, "Wild orange" (*Cerasus Caroliniana*), in this volume. The arbor vitæ, when it can be grown large enough, as in Canada, furnishes one of the hardest and most durable of woods, adapted to all the purposes of the turner and machinist, for the construction of posts, fences, etc. "Fences made of it last three or four times longer than those constructed of any other wood." Wilson. The leaves are employed like the savin (*Juniperus*) in making a stimulating ointment. If the grain is close and compact it may be found to suit the purposes of the wood engraver. See "*Amelanchier*" for wood for engraving. In Canada, the thin, narrow pieces of wood which form both the ribs and the bottom of the bark boats are taken from this wood, because it is pliant enough for the purpose when fresh, and also because it is very light. The wood is considered one of the best for the use of lime-kilns. Its branches are used in Canada for brooms, which leave their peculiar scent in all the houses where they are used. Farmer's Encyc.

Schubertia of later Bot. } Bald cypress.
Cupressus disticha, L. and Ell. Sk. } Grows in swamps in the lower portion of South Carolina and Georgia; vicinity of Charleston; St. John's.

Mér. and de L. Dict. de M. Méd. Supplem. 229, 652; see the Cultivateur, ii, 668, for an article upon the cypress.

Recherches sur l'histoire du Cyprès, Ann. de Hortic. xv, 37; Strauss, Mém. sur le Cyprès, Montpellier, 1841; Mirbel, Abridg. des Voyages, xiii, 396; S. T. Cubieres' Mem. on the Cypress of Louisiana (in French), Paris 1809. This remarkable tree, lifting its giant form above the others, gives a striking feature to our swamps. They seem like watch-towers for the feathered race.

For a description see Michaux, N Am. Sylva, Shec. Flora Carol. 484. The seeds are said to possess an odoriferous principle; a rich balsam of a deep red, inclining to black, is obtained by boxing the tree, and from the nuts and fruit by distillation. It is applied to cuts and wounds, and is possessed of valuable balsamic properties; the cones are also balsamic, and the resin from them is diuretic and carminative. This is undoubtedly one of the most valuable timber trees that we possess. The wood is soft, and rather fine grained, resisting the action of weather and the changes of temperature remarkably well; hence used for making the interior work of houses, posts, shingles, staves, etc. Barton mentions that boats from eight to twelve feet diameter and eighty feet straight shaft are made out of a single trunk. See, also, Ell. Bot. for a description; and also an elaborate paper in the April number of the Am. Journal of Science for 1848, by Drs. Dickeson and Brown, a committee from Louisiana, appointed by the Association of Geologists and Naturalists. Cypress leaves boiled during several hours afford a fine, durable, cinnamon color. The tree should be felled in winter.

Cupressus thyoides, L. (White cedar.) Said to grow around the savannas in Horry and Williamsburg districts; Newbern.

Ell. Bot. ii, 644; Griffith, Med. Bot. 610. The infusion is reputed to be stomachic, and in the warm state diaphoretic. The wood is soft, fine grained, light and durable, and is adapted for purposes similar to the above. The young trees are easily handled and transported, and are

particularly suited for telegraph poles. Shingles from this, sometimes called juniper shingles, last for forty years.

Juniperus Virginiana, Linn. Cedar. Grows in upper and lower districts; Newbern. Fl. March.

Big. Am. Med. Bot. iii, 49; Pe. Mat. Med. ii, 184; Fr. Elems. 195; U S. Disp. 413; Mér. and de L. Dict. de M. Méd. iii, 698; Mich. N. Am. Sylva, iii, 221; Am. Journal Pharm. xiv, 235; Thacher's Disp. 247; Lind. Nat. Syst. Bot. 316; Griffith, Med. Bot. 607; Supplem. to the Dict. de M. Méd. 1846, 406; Bull. de l'Acad. Roy. de Méd. vi, 478; S. Cubieres' Mem. on the Red Cedar of Virginia, in French, Paris, 1805; Nicolet's Essai on the Physiol. and Chemistry of genus Juniperus; see Journal de Pharm. xxvii, 309, and Bonastie's note on a volatile oil from the Virginia cedar, in Journal de Pharm. xxi, 177, 1834.

The bark is employed in Abyssinia, under the name of *Bisenna*. The expressed oil is very useful as an application to rheumatic pains and swellings of the joints. One bushel of the dried shavings, heated in an inverted iron vessel, will yield a half-pint of oil. A decoction of the berries promotes diaphoresis, and is also beneficial in rheumatic pains, stiff joints, etc. It acts very much as savin, being stimulant and emmenagogue, and employed in catamenial obstructions.

The cedar berry is used in a popular remedy for dropsy, which is claimed by some to be highly efficacious. We can readily understand the reason that it may prove useful when we remember its close alliance with the juniper berry. It is as follows: take one handful of the seed of the cedar, the same of mullein, the same of the root of dogwood; put into two quarts and a pint of water, boil down to one quart, and add one gill of whiskey. Dose, a wineglassful night and morning. A cerate is made for keeping up the irritation and discharge from blisters; this is quite serviceable, and is prepared by boiling the fresh leaves in twice their weight of lard, with the addition of a little wax. The fungoid excrescences on this tree are thought to be anthelmintic.

The wood of this tree is well known. It is sometimes dug up in the mud of our swamps in a perfect state of preservation. It is aromatic, light, soft, bearing exposure to water and weather, and suitable for all kinds of cabinet work, in the construction of posts, staves, the inner work of houses, and particularly in the building of boats. Cedar boxes are not infested by insects, moths, etc., and are used for storing away woollens. The leaves also prevent the attacks of insects when spread over cloth.

Class III. ENDOGENS, OR MONOCOTYLEDONS.

Marantaceæ. (*The Arrow-root Tribe.*)

Maranta Arundinacea. Bermuda arrow-root. Cultivated in South Carolina for domestic use.

U. S. Disp. 449; Royle, Mat. Med. 585; Bell's Pract. Dict. 48. See authors. The root is grated, washed, and then dried in the sun on flat dishes.

In a report to the Patent Office by Robert Gamble, of Florida, published in volume of 1851, p. 326, he says:

"The Bermuda arrow-root flourishes throughout South Florida, producing, even in the pine lands, from 200 to 300 bushels to the acre, the quantity being largely increased when planted on rich lands. The yield of merchantable arrow-root flour obtained by very imperfect mills is from six to eight pounds to the bushel—worth from 25 to 30 cents per pound. Along our Atlantic coast south of 27° the *Cumpti*, or Indian arrow-root, grows spontaneously, giving results nearly equal to that of Bermuda, with the advantage that it requires no cultivation. The sole labor consists in bringing it from the forest lands and conveying it to the mill, the simple stirring occasioned by the digging being sufficient to secure a better crop than the one just removed. The Sisal hemp grows readily and luxuriantly,

even upon our pine lands, and will eventually become a valuable staple, but in the multitude of others it is at present overlooked. So, also, the Palma Christi, which becomes a tree, and is perennial." See "Jerusalem artichoke" (*Cynara*), and "Potato" (*Convolvulus*), for substances yielding starch. P O. Reports on Agriculture, p. 324, 1858, contain a condensation of a report before the Am. Pharm. Assoc. by R. M. Batty, of Rome, Ga., on the "Production and Manufacture of Arrow-root in the South," with an account of the apparatus used in rasping. It is made a staple crop by one or two gentlemen near St. Mary's, and 2,900 pounds of Georgia arrow-root was sold in Savannah in one year. It can be raised by any farmer or planter. "Costing no actual money expended, the consumption of it as a dietetic article is unrestrained, and it supplies the place in great measure of corn starch, farina, Irish moss, gelatine, and even rice and flour, in the preparation of delicacies for the table, as well as the invalid's chamber." The yield of roots of all sizes to the acre is about 150 bushels. Col. Hallows, St. Mary's, Ga., has gone largely into the field culture, and has erected extensive buildings and machinery. Another species of plant grows wild also in South Florida, from which Florida arrow-root is made. It is called *coonti*, and is described in the New Am. Enc. as a species of sago palm (*Zamia integrifolia*). A fecula was formerly prepared and used by the Florida Indians from the *Chamærops serrulata*, or saw palmetto.

The cultivation of the arrow-root is precisely that of the sweet potato. A rich, fresh, sandy soil, a large, full bed, the seed (roots) placed six inches deep and a foot apart, careful hoeing and keeping the bed up, constitute the culture. The seed roots should be planted as soon as the spring is confirmed—with us (Ga.) about the middle of March. The smaller tubers or roots are to be selected for seed, and are best preserved by placing ten to fifteen bushels in a conical heap, stacking closely around them a layer of corn-stalks, and placing over the whole a coating of two or three inches of earth. The object is to keep up a

uniform temperature, and to avoid dampness and the extremes of heat and cold. The plants are allowed to grow until the leaves and stems are slightly affected by the frost, the roots are then to be dug as potatoes, the larger selected for manufacture and the smaller for seed. Those intended for manufacture are to be stacked in heaps of twenty to twenty-five bushels in the same way as directed for the seed roots. They must be carefully protected from cold, as the fecula is changed by freezing.

The following is the mode of manufacturing for family use: the roots are washed, the scales on the outside removed by hand with a knife, and then again washed and placed in a tub of pure water. The next operation is to rasp down the roots by pressing them endwise against the circumference of the rasping machine. (P O. Reports, 1858, see plate vi.) This machine consists of two wooden discs, framed as large pulleys, about three and a half feet in diameter, placed six inches apart and covered with strong tinned iron, punched from within like a coarse nutmeg grater. It revolves around a central axis of wood with as great a velocity as can be given without throwing off the water from its circumference. A large trough is placed under the wheel, which is kept nearly full of water, the wheel dipping into the trough about six inches. As the wheel revolves the grated pulp is washed off into the trough, and when it becomes too thick the mass is passed into a large tub and the trough refilled with fresh water. The pulp collected in the tub is then pressed by hand until the fecula is separated from the fibre, and after removing the latter the fecula is allowed to settle to the bottom. The next and most important operation is to pour off the water from the sediment, and when the latter has become pretty firm, to break it carefully into cakes and with a large knife blade to remove from the bottom all sand and other impurities. The cleansed portion is then to be resuspended in a tub of pure water, allowed again to settle, again dried and cleansed. This operation must be repeated until the fecula settles in a perfectly white and clean cake. On

the careful performance of this part of the manufacture depends the excellence of the article. The cakes are next to be broken up and placed upon cotton cloth stretchers until thoroughly dry and pulverulent, when the powder should be firmly packed in boxes or barrels. Air-drying in the shade is preferable to sun-drying, and dust must be sedulously avoided. Whatever the scale of manufacture and the machinery used, the essential points are: 1st, maturity of the roots; 2d, cleansing the roots before rasping; 3d, rasping so as completely to separate the fecula from the fibre; 4th, separating the fecula from sand and all other impurities by frequent agitation and subsidence; 5th, thorough and careful drying to avoid mustiness or mildew; 6th, packing so as effectually to exclude the air.

The principle of separating fecula being the same, any labor-saving machinery adapted to the manufacture of potato starch may be applied to arrow-root. On a large scale there would be great economy in driving several rasping machines by an engine, agitating the feculent mass from the rasper in large vats, filtering through cloths, drying by hot air in large buildings furnished with cloth stretchers, etc. Tinned iron is used for the rasping part of the mill, and wooden vessels for washing and precipitation. The reader will consult the article cited for the best mode of cultivation. The writer quotes from Mr. Hamilton Cooper or Col. Hallowes, I believe, as follows: "There is no secret in making arrow-root. The great requisition, after the roots have been well washed and reduced to a fine pulp, is an abundance of water together with great cleanliness, and until the hands are well trained, the constant vigilance of the master. The latter is more or less necessary at all times. The pulp is passed at one operation through three sets of sieves of different degrees of fineness, put into motion by machinery, and using an abundance of water. As it is strained the fluid runs into vats, where it is allowed to settle, water drawn off and fresh water added, stirring up the sediment thoroughly. This process is repeated a second time, and it is then

strained through sieves of the finest bolting cloth, again washed with successive portions of water, allowed to settle in tubs, water decanted, and the tubs removed to the drying house, where the fecula, when settled into a solid mass, is broken up and placed on frames of convenient size, covered with cotton shirting, which are carried into the drying room, heated artificially, and allowed to remain eighteen to twenty-four hours, taken out, allowed to cool, and put into bins ready for packing. I use boxes containing about one hundred pounds each. In the course of the process of the manufacture I have attempted to describe three thousand gallons of water are used daily, all of which is furnished by a well of the purest water, not exceeding twelve feet in depth. The use of tank water, it is thought, may be the cause of the pearly appearance of Bermuda arrow-root, or the greater maturity of the plant. Ure says it requires eleven months to mature in the island of St. Vincent." What is called Portland sago is made from the *Arum maculatum*; we have two species in the Confederate States. See "*Arum*," in this volume.

I have seen the plant cultivated and the arrow-root prepared on the plantations in St. John's, Berkley, S. C. The great value of arrow-root as an article of food for the sick and convalescent, and its consequent great utility to our armies in the field, make it particularly desirable that its culture should be extended at this time. I therefore introduce the following directions by the late Governor Seabrook of South Carolina. The method of culture is simple, and is as follows: upon a piece of ground moderately high, and of a loose soil, make small beds three feet asunder, and at the distance of every two feet drop one seed, which should be covered about two inches deep. The middle of March is the proper season for planting, and no care or attention is subsequently required but to keep the plants free from grass and weeds. After the first frost they should be dug, and when you have selected the seed it is necessary for their preservation that they should be buried at least one foot in some dry and warm spot.

The preparation of the root for food is tedious, and in consequence of the toughness of the outer coat it would be advisable to perform the operation as speedily as possible after digging. As soon as this is effected, grate the roots in a clean vessel of water, then pass the contents thereof through a sieve; this must be repeated, taking care to change the water at every successive operation so long as any coarse particles remain in the sieve. The water is then allowed to settle, and if it exhibits a clear and natural appearance the sediment is in a fit state to be be dried, which should be done, if possible, in the sun, and in a confined situation, where no dust can reach it. To a tablespoonful thus prepared pour on a pint of boiling water, stirring it at the same time briskly, to which add a little sugar and nutmeg, and you will then have a jelly pleasant as it is healthful. Boiled with milk it is excellent.

When starch is obtained from any other plant than one of the grains, as from potatoes, corn, flag, bryony, horse-chestnut, wild orchis, dogbane, burdock, iris, henbane, patience, ranunculus, etc., it is known by the name of fecula. Chaptal describes two processes for extracting starch, by washing with cold water and by fermentation, the latter being more efficient:

When starch is to be extracted by cold water, the substance must either be reduced to the state of flour or be broken so that the pulp can be acted upon by the water. In the first place the flour of wheat is kneaded with water till it takes the consistency of a stiff paste; this is placed on a cloth stretched tightly over a tub and cold water thrown upon it; the kneading with the hand is continued till the water runs off clear; the fecula is carried off by the water and deposited at the bottom of the tubs; the water retains in solution the sugar and the extractive matter of the farina, while the insoluble gluten alone remains upon the filter; the deposit is washed to free it from any foreign substance, and then dried. When it is not wished that the substance containing the fecula should be reduced to flour, it may be broken in a mortar or under a millstone, or it

may be grated; the pulp is then to be placed upon a very fine horse-hair sieve and water thrown upon it till it runs off clear, care being taken to stir the pulp constantly with the hand and to squeeze it hard. When the substance from which the fecula is to be extracted is fleshy and of a loose, spongy texture, it can be reduced to a pulp by means of a press: the juice thus expressed deposits the fecula, which must be carefully washed in order that the noxious principles contained in it may be perfectly separated. The whiteness and excellence of the fecula depends upon its being thoroughly washed.

Fermentation is the means most commonly employed for extracting starch from grain, but this operation will produce only alcohol if care be not taken in mixing the acid with the grain to prevent the spirituous fermentation. This acid is made by mixing with a bucket of hot water two pounds of baker's yeast, to which is added two days after several buckets of hot water; in forty-eight hours from that time the acid will be sufficiently developed. This acid, which is called by the starch manufacturers *sure water*, is thrown into a hogshead having one end taken out. The hogshead is then filled half-full of common water, into which flour is stirred till it is full; the whole is then left to macerate during ten days in summer and fourteen in winter. The sufficiently advanced state of the maceration may be known by a deposit being formed and the liquor above it remaining clear, while the surface is covered with foam or *fat water*. The water and foam are drawn off, and the deposit is thrown into a sack of haircloth, which is placed in a tub and water thrown over it till it runs off without any cloudiness. The substance remaining in the bag, which is only the coarsest part, serves as food for cattle. At the end of two or three days the water floating above the deposit formed in the tub is drawn off, and a part of it preserved to serve as *sure water* for succeeding operations.

In order to have good starch, the water must be washed in a great deal of water and well mixed; two or three

days after the water for the remaining washings may be thrown on. The deposit which forms presents three layers, differing widely in their quality; the first is principally composed of fragments, and is taken off as food for cattle or to fatten hogs with. The second layer is generally formed of the mealy part of the vegetable mixed with some other substances; the product of this layer is known under the name of common starch. The third layer contains the purest and heaviest starch, but in order to give it all the qualities it ought to possess it must be washed with water, and the water afterward separated from it by filtration through a sieve of silk, so as to free it from all impurities. With these precautions starch may be obtained fitted for any use. As soon as the starch has been well washed it is put into baskets lined with linen to be well drained. It is afterward divided into loaves, and the drying finished by exposing it in the open air upon laths. Before packing for sale, the surface of the loaves, which is slightly colored, is scraped, and the drying of them is completed in the sun or in a stove. Starch acted upon by sulphuric acid is converted into sugar, and in this state may be made to undergo the vinous fermentation; a few years since extensive establishments were formed in France for supplying numerous distilleries with the fecula of the potato which had been treated in this manner.

AMARILLIDACEÆ. (*The Narcissus Tribe.*)

Some of these are poisonous, and Lindley says that it is one of the few of the monocotyledonous orders in which any poisonous properties are found.

Agave Sisalana. Sisal hemp.

This gigantic plant has been introduced into Florida by Dr. Henry Perrine, who was consul at Yucatan. It is said by W C. Dennis, of Key West (P O. Reports, 1855, p. 243), to delight in arid, rocky land, which contains a superabundance of lime. It is adapted probably only to the south of Florida, where it can be cultivated during the

absence of frost. It does not require a great deal of culture, but grows on arid, rocky soil around Key West unfitted for any other purpose. "In fact, the land on these keys and much of it on the southern point of the peninsula is nearly worthless for every other agricultural purpose, so far as known, yet there are thousands of acres in this region where a ton of clean Sisal hemp can be made to the acre yearly, after the plant has arrived at such an advanced state of maturity as will allow the lower leaves to be cut from it, which takes in this climate from three to five years to grow, according to the goodness of the soil. Nor is there any longer a doubt as to the goodness of the fibre, a number of tons having already been collected and sent to market, where it readily brought within a half cent to a cent per pound as much as the best kind of Manilla hemp; that is, in the neighborhood of two hundred and fifty dollars per ton." See article cited for method of planting and preparing. "About a thousand plants should be set on an acre, and from young ones coming up from the long lateral roots; if these be kept at proper distances it will be seen that the same land requires no replanting if coarse vegetable manure be applied from time to time. After the plant is of sufficient growth the lower leaves are cut off at proper times, leaving enough on the top to keep it healthy. These leaves are composed of a soft, watery pulp, and are from two to six feet long, and in the middle from four to six inches wide, being frequently three inches thick at the but, but having the general shape of the head of a lance. They contain a gum, which is the chief cause of their being rather troublesome in separating the fibres from the pulp. Neither the epidermis nor this pulp is more than a powder after becoming dry if the gum be entirely crushed and washed out."

This is a most important fact in relation to the manner to be adopted to cleanse the fibres from the pulp. As these are continuous, and parallel, and imbedded in it, I feel certain that a system of passing the leaves through a series of heavy iron rollers firmly set, something after those used

in crushing sugar-cane, and throwing water on the crushed leaves, in jets or otherwise, in sufficient quantities to wash out the gum (which is perfectly soluble in it), will thoroughly clean out the fibres, without any loss, so that after they are dry, and have been beaten to get out the dust, they will be fit for market; at any rate, the right plan for separating the fibres has not yet been discovered, although there has been enough done at it to show that they can be got at a profit.

I obtain the following statements from the Patent Office Reports, 1856, p. 252, by W C. Dennis: "The plant evidently requires dry, hot weather, as well as a dry soil; for since I have observed its growth I have never seen it suffer from drought in the driest and hottest weather and in the most arid spots, provided its roots could find a plenty of the right kind of soil. The meteorological record for the last twenty-five years shows that this plant is well adapted to these keys and the southern extremity of the peninsula, for such winters as the two designated are evidently rare.

"It would seem that there are lands enough in Florida, south of the limit where the frost would injure this plant, to grow it in sufficient quantities for the present and prospective wants of the country, and that, too, in a frontier region which it is of national importance to settle. As far as known, these lands are not well adapted to an extended range of agricultural products, yet I am certain that the tropical agaves in all their varieties will flourish here in the greatest perfection.

"Mr. Hermonds, of Indian river, Florida, says that Sisal hemp grows well there, and has continued to thrive well for years. He thinks that my last year's estimate of the product per acre is too low for that region. The experiments I have made within the past year in getting out a number of tons of this fibre convince me there are but few difficulties in accomplishing this work cheaply. These experiments prove that if all the vesicles of the leaves are ruptured by crushing or rolling, the pulp and gum are easily washed out either by salt water or fresh. The plan

which I found most successful was to roll the leaves, being careful to rupture all the vessels, then confine these crushed leaves in an open-work wooden frame or box, which I placed in such a manner that the tides forced the sea-water through them both at the ebb and flow. In this manner the gum and pulp were so far washed out in from three to six days (according to the temperature of the air and water) that by beating the fibres a little after they were dry they were fit for market.*

"Mr. Hermonds mentioned as a tested fact that steeping the crushed leaves in boiling water, even for a few minutes, at once dissolved the gum and cleaned the fibre. This renders it almost certain that where a steam-engine is used to propel rollers and crush the leaves the waste steam can be rendered effective to clean this hemp by blowing it off between the rollers, aided by a little water in a jet, while the leaves are passing through.

"The amount of the imports and consumption in this country of fibres similar to Sisal hemp in 1854 was over $2,500,000, of which more than $1,500,000 was for Manilla and Indian hemps, and over $1,000,000 for gunny bags and cloth, jutes, etc.

"I am of opinion that this hemp can be cleaned, and cheaply, by running the leaves through a series of powerful rollers, having water dashed on them during the operation; and this plan would be much facilitated in this region from the fact that the gum of the leaves seems equally soluble in salt water as in fresh. But experiment must decide which of the methods would be the best. Care must be taken not to allow the leaves or fibres to come in contact with the mud or other substances which will stain them while they are in a damp state; and it will be well to have them in the sun, or strong light, while under the process of cleaning and drying; for the juice of the plant is both a saponaceous and a bleaching fluid.

"Last year I spoke of the fact that the celebrated pulque

* Would not this method be objectionable on account of the difficulty of drying the fibre or the materials manufactured therefrom? D. J. B.

plant (*Agave pulque*) was introduced by Dr. Perrine. It grows enormously large here where there is sufficient depth of soil, and although I presume that the mean temperature is too high to make from it the Mexican drink, yet alcohol could be distilled from its juice, and probably the leaf can be made to yield a cheap and abundant material for paper. The ancient Aztec made much of the paper on which his picture-writing was transcribed out of the leaves of one or more of the varieties of the agave; and this pulque plant most likely is one of the kinds; for its thick, fleshy leaves, containing very fine fibres, are sometimes eight feet long and from seven to eight inches broad."

Agave Virginica, L. Called by negroes rattlesnake's master. Grows in damp soils; collected in Wassamasaw, St. John's; vicinity of Charleston.

Ell. Bot. i, 402. A domestic remedy for flatulent colic; used in Charleston district for the bite of the rattlesnake.

Amaryllis atamasco, L. Atamasco lily. Grows in damp soils; collected in St. John's, Berkley; vicinity of Charleston.

Ell. Bot. i, 384. This is supposed to produce the disease in cattle called "staggers."

Pancratium maritimum, Walt. }
" *Carolinianum*, L. } "Seen by Catesby in the Parachucla savanna, St. Peter's parish," Ell.; collected on Cooper river, St. John's, Berkley.

Mér. and de L. Dict. de M. Méd. v, 179; Dioscorides, lib. ii, c. 168. Pliny also speaks of it, lib. xvii, c. 12. The bulbs are bitter and emetic, and are useful in dropsy. Loiseleur, Manuel des Plantes Indigènes, 19. In the experience of one writer forty grains of the powder produced vomiting five times.

HÆMODORACEÆ. (*The Blood-root Tribe.*)

Dilatris tinctoria, Ph. }
Lachnanthes, Ell. Sk. } Newbern; Florida.

Griffith, Med. Bot. 622. The root is astringent and

tonic. It is distinguished, says Wilson, for yielding a beautiful dye; hence the name. Rur. Cyc.

Burmannaceæ.

Tripterella cœrulia, L. Blue tripterella. Grows near Savannah and Purysberg; collected in St. John's, Berkley, near Pinopolis; vicinity of Charleston. Fl. Nov.

Lind. Nat. Syst. Bot. 331; Nuttall, in Acta, Philad. 723. A flavor like that of green tea is discernible in this plant.

Iridaceæ. (*The Corn-flag Tribe.*)

Iris versicolor, L. Var. *a* and *b*. Blue flag. Grows in bogs, morasses, and inundated land; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Coxe, Am. Disp. 354; Lind. Nat. Syst. Bot. 333; U. S. Disp. 405; Big. Am. Med. Bot. 105; Bartram's Travels, 451; Cutler's Mem. Am. Acad. 405, 6; Ell. Bot. 146; Mér. and de L. Dict. de M. Méd. iii, 659; Frost's Elems. 279.

The expressed juice is acrid, and has been employed as a local application; it is also purgative, and sometimes occasions distressing nausea like sea-sickness, accompanied with prostration of strength. The plant is, however, more remarkable for its diuretic powers. It was prescribed by Dr. McBride with great success in dropsy, combining it with the button snakeroot (*Eryngium yuccifolium*). The proportions are as follows: root of blue flag one ounce; button snakeroot two drachms; water half a pound; which is to be boiled down to one pint and taken in divided doses. See Bigelow. This does not disturb the stomach, and was used with success in cases of hydrothorax combined with anasarca. Bartram said the root was considered by the Indians a very powerful cathartic, and it was found in artificial ponds made for the purpose near their villages. See his Voyage dans la partie sud de l'Amérique Septentrionale, ii, 322, and the Supplem. to Mér. and de L. 1846. According to Bigelow its active chemical constituent seems to be a *resin*, which separates as a white precipitate when

water is added to the alcoholic tincture. The plant is much employed in domestic practice in St. John's, Berkley, in dropsy.

Iris Virginica.

Griffith, Med. Bot. 625. It is said to possess properties similar to those of the *I. versicolor.*

BROMELIACEÆ. (*The Pineapple Tribe.*)

Tillandsia usneoides, Linn. Long moss. Grows within the tertiary districts of South Carolina; I have observed it as high up as Columbia; Newbern.

Mér. and de L. Dict. de M. Méd. vi, 743; Journal de Pharmacien, iii, 185. It is stomachic, purgative, and even diuretic. Employed in hemorrhoids. *Op. cit.* I see no notice of it in the American works. Great use is made in South Carolina of this plant when dried in stuffing chair cushions, mattresses, etc. It gives to the trees in winter quite a venerable and pleasing aspect, and is an indication of great moisture.

ORCHIDACEÆ. (*The Orchis Tribe.*)

Some species of orchis are said to possess aphrodisiac properties. The roots when boiled are farinaceous and eatable, furnishing an article of food. Attention is invited to those growing in the Confederate States, among which are several beautiful species.

Bletia verecunda, N. Elliott is doubtful whether it grows in South Carolina. Mich. cultivated it near Charleston. Fl. Aug.

Lind. Nat. Syst. Bot. 239. The cormus is said to be stomachic and tonic; see Browne's Jamaica.

Bletia aphylla. Nutt.

The tuberous root, as well as the whole plant, contains a great deal of gum and starch. It has a gummy taste, and is closely related with *Aplectrum hiemale* (*Corallorrhiza* of

Ell.), which has the name putty-root, probably from the same property of gumminess and adhesiveness. The granules of the first named can be seen with the microscope. I have ascertained that it forms an excellent gum in place of Spalding's glue or gum-arabic. Paper united by means of it tears before it will separate. It should be well broken up in a little water.

Cypripedium pubescens, W Yellow lady's slipper; yellow moccason. Newbern.

Griffith, Med. Bot. 640. It is employed by the Indians, and held in high estimation in domestic practice as a sedative and antispasmodic, acting like valerian in alleviating nervous symptoms; said to have proved useful in hysteria, and even in chorea. A teaspoonful of the powder is taken at a dose. *Op. cit.*, and Raf. Med. Fl. 140. More use might be made of this tea as a quieting agent in place of paregoric; see "Tilia."

PALMACEÆ. (*The Palm Tribe.*)

Chamærops serrulata, L. Saw palmetto. Grows on the coast of South Carolina, and at Blythe's island, in Georgia. Mr. Elliott says that it extends also through the pine lands of that state.

Shec. Fl. Carol. 435. The pulp is very sweet, but is possessed of a purgative property, often producing a copious evacuation attended with griping.

A correspondent, "F I. S," of Charleston "Mercury," from Waresboro, Ga., writes as follows in adding to our "resources:"

"You speak of black moss for mattresses. Our common saw palmetto leaves, when split into shreds with a fork or hackle, boiled, and dried in the sun one or two days, make a light, clean, healthy, and durable mattress. Let me suggest that palmetto pillows would be cheap and comfortable for our soldiers on the coast; their corn and flour sacks would in the absence of anything better furnish ready-made pillow ticks. Our negroes are busily employed in

making light, durable, and handsome palmetto hats for our soldiers—quite a protection from the sun's burning rays in the heavy drills of this and the next two months. A bed made from a downy swamp plant, which our people call cat's tail, took a premium at the late Agricultural Fair in Carolina.

Chamærops palmetto, Mich. } Tall palmetto. Cabbage
Corypha palmetto, Walter. } tree. Grows along the seacoast; vicinity of Charleston.

Ell. Bot. Med. Notes, i, 432.

From this noble and characteristic tree is derived the well known armorial emblem on the escutcheon of the State of South Carolina. It scarcely needs any description at my hands. It has been carried in the fore-front of battle by every regiment in the service of the state from Mexico to Manassas. The leaves are employed in the manufacture of hats, baskets, mats, etc. Forts, wharves, conduits, and structures under water are made of the logs, which do not splinter. The cabbage, or expanded embryo, may be classed among the "most delicious vegetables produced for our tables." The tree, however, perishes when deprived of these. State enactments should forbid their destruction, for ere long when the supply is exhausted the tree will still be absolutely required. Griffith says (Med. Bot. 614) that the bark contains tannin.

Pieces of the spongy part of the stem afford a very good substitute for scrubbing brushes, and are much used in Carolina and Georgia. The leaves of the smaller species afford excellent and durable thatch for covering barns and outhouses; and the younger leaves of the cabbage tree are manufactured into beautiful light and durable hats. Since the war (1862) the tree has been highly useful for this purpose. The repent caudex of the saw palmetto (Farmer's Encyc.), being torn from the surface of the earth, cut into proper lengths, dried, and burned to ashes, produces the greatest quantity of potash of any known vegetable. The drupes, or large berries of this species, which are of the

size and figure of dates, and as sweet, afford good and nourishing food to the Indians and hunters. They are not palatable to white people till they become accustomed to them. *Op. cit.*

Sabal adansonii, Guerns. } Dwarf palmetto. Swamps in
" *pumila*, Ell. } lower districts.

Excellent fans may be made of the leaves. The "bane and antidote" are both present in abundance in the same locality—mosquitoes and the palm-like leaves of the dwarf palmetto!

MELANTHACEÆ. (*The Colchicum Tribe.*)

"Poisonous in every species."

Melanthium Virginicum, W. Grows in wet soils.

Griffith, Med. 641. In infusion it is an effectual anthelmintic. It will operate as an active poison. The decoction, used as a wash, is a certain but somewhat dangerous cure for the itch.

Chamælirium Carolinianum, Willd. (K'th's En. Pl.) }
Helonias dioica, Ph. and Ell. Sk. }

Common blazing star. Grows in damp pine barrens; collected in St. John's, Berkley, Charleston district, near Pinopolis; vicinity of Charleston; Newbern. Fl. July.

Lind. Nat. Syst. 348; Ell. Bot. i, 423; De Cand. and Dubug. 472, an. 1828; Matson's Veg. Pract. 218. The infusion is anthelmintic and the tincture tonic. Prof. Ives recommends it as efficient in checking nausea and vomiting. The Indian women employed this plant in preventing abortion. It is used by the vegetable practitioners in debility of the digestive organs, given in doses of a half-teaspoonful of the powder in warm water three times a day. The root when chewed relieves cough.

Amianthus muscætoxicum, Gray in K'th's En. Pl. } Fly
Helonias erythrosperma Mx. and Ell. Sk. } poison.

Grows in rich, shaded soils; collected in St. John's, Berk-

ley; near Brunswick, Pl. (T. W Peyre's, Esq.); vicinity of Charleston. Fl. May.

Ell. Bot. 421. "A narcotic poison, employed in some families to destroy the house-fly. The bulbs are triturated and mixed with molasses. The flies, if not swept in the fire, or otherwise destroyed, revive in the course of twenty-four hours." I would invite others to an examination of this plant as a remedial agent.

Veratrum viride, } Itch-weed; Indian poke;
" *album*, Mich. } white hellebore. Abbeville district, S. C.; grows in mountain streams.

Lind. Nat. Syst. 348. "An acrid emetic and powerful stimulant, followed by sedative effects." Big. Med. Bot. ii, 125. Dr. Tully also says it is a deobstruent or alterative, an acrid narcotic, an emetic, an epispastic, and an errhine; found very useful in gout, rheumatism, diseases of lungs, and some complaints of the bowels. Osgood, in the Am. Journal Med. Science, states that it is perfectly certain in its operation, and is, in all respects, analogous to colchicum, which it should supersede. Bigelow states that in his hands it has arrested the paroxysm of gout, and has given relief in some cases of protracted rheumatism. It has been externally employed, in the form of ointment, in many cutaneous affections. Mr. Worthington, who made a full analysis, found *veratria*, gallic acid, extractive, etc. See Am. Journal Pharm. N S. iii; Dr. Osgood's examination, Am. Journal Med. Sci. 1835, and Am. Journal Pharm. i, 202, N S.; Griffith, Med. Bot. 644; Am. Journal Pharm, N. S. iv, 89; Raf. Med. Fl. 585. The tincture or the extract is the best form of administration; the dose of the first is thirty drops, of the latter one-third of a grain, gradually increased. Kalm says that corn soaked in a strong decoction will be protected against the encroachment of birds; those that eat of it becoming giddy fall to the ground, and thus deter others. The plant is considered eminently deserving the attention of the profession.

The above was written in my report printed in 1849. The great value of this plant is now fully recognized as a depressor of the heart's action. It is also emetic and expectorant. As it is scarce, our other species, *V intermedium*, growing in Florida, and *V parvifolium* of Mx., found in the mountains of North Carolina, should be examined. Many of the recent journals and medical treatises contain full descriptions of the application of the *V viride* to the treatment of typhoid and yellow fevers, pneumonia, etc. See Charleston Medical Journal for Drs. Ford and White's paper on the treatment of yellow fever with this agent. The same journal contains papers by Norwood and others on the employment of this powerful sedative. Its discovery is encouraging to those who believe that the same perseverance and enlightened skill which gave us quinine, morphia, and chloroform, may add still more conquests as greater familiarity is attained with the vegetable wealth of our country. The dose of the tincture of *V viride* is three to four drops, cautiously increased. The remedy for an overdose is alcoholic stimulants. Dr. Norwood, of South Carolina, deserves great credit for establishing the method of using the *V viride*. His tincture is made by macerating eight ounces of the dried root in sixteen ounces of alcohol for two weeks; dose, from six to eight drops, repeated cautiously every three hours, gradually increasing till its effects are produced. The roots should be collected in autumn; they deteriorate.

Veratrum parvifolium and angustifolium. Both are found in South Carolina; they are probably active, and should be examined.

Gyromia Virginica,
Medeola " Linn. and Ell. Sk. } Indian cucumber; Virginian medeola. Grows in moist soils; generally found under beech trees; Newbern. Fl. June.

U. S. Disp. 274. Pursh states that the root was eaten

by the Indians. Dr. Barton thought it useful in dropsies. Bart. M. Bot.; Lind. Nat. Syst. Bot. 318. It enjoys some reputation as a hydragogue. Mér. and de L. Dict. de M. Méd. iv, 270; according to which it is esteemed a very active diuretic. De Cand. Essai, 293.

Trillium sessile, L. Rare; grows in rich shaded soil; collected in St. John's, Berkley, near Wantoot Pl.; vicinity of Charleston; I have observed it on the Ashley road. Fl. May.

Lind. Nat. Syst. Bot. 348. "Roots generally violently emetic."

LILIACEÆ. (*The Lily Tribe.*)

Erythronium Americanum, L. }
" *lanceolatum*, Ph. } Dog's-tooth violet; adder's tongue. Grows in the upper districts and in Georgia; sent to me from Abbeville by Mr. Reed. Fl. April.

U. S. Disp. 318; Big. Am. Med. Bot. iii, 151; Mér. and de L. Dict. de Mat. Méd. iii, 147; Coxe, Am. Disp. 269; Bart. Flora N. Am. 133; Griffith, Med. Bot. The recent bulbs are emetic when powdered and given in doses of twenty to forty grains. When dried or cooked they become eatable. The berries are said to be more active and certain in their operation than the root.

Yucca filamentosa, L. Bear-grass. Diffused; I have collected it in Sumter district, S. C.

A tincture of the roots is much employed in rheumatism. The "Cherokee doctors" use it in the form of a poultice of the roots, or a salve, as a local application in allaying inflammation.

The fibre is uncommonly strong, and is used for various purposes on our plantations: for making thongs for hanging up the heaviest hams, bacon, etc. I do not know whether it has been tried as a substitute for hemp and cordage, as Mr. W G. Simms suggests in a letter to me.

I have since (July, 1862) seen an article in the Charles-

ton Courier, entitled "Confederate Flax," in which it is stated that Mr. D. Ewart, of Florida, had presented for exhibition "specimens of scutched fibre, and of cordage and twine of different sizes, made from the very common plant familiarly known as bear-grass, or Adam's needles." He also communicated the processes employed in reducing it to cordage. The Columbus (Ga.) Sun, of a later date, reports a coil of rope made by Mr. Jas. Torrey, which was pronounced by competent authority to be equal to Kentucky rope. The plants in the above instance were rotted and prepared by a negro boy.

Gov. Call (see Southern Cultivator, p. 27, vol. 5, 1847), in stating that the bear-grass is an evergreen, says that it may be prepared for use at any season, as it sustains no loss or depreciation by remaining in the ground. Six months growth will give a plant of good size, and the hemp made from such a plant will be as long and possess quite as much strength as that made from plants of older growth. But it will have fewer leaves, and consequently produce less fibre. It will require planting but once in a lifetime, and with but little culture will produce abundant crops of five or six tons per acre. "After boiling the leaves and putting them up in small bundles of convenient size for the purpose, I have passed them through an ordinary wooden sugar mill, dipping them in water at each passage until the surplus matter has been removed, leaving the fibres perfectly cleansed, unimpaired, and ready for use." It can be propagated by cutting the roots like the sweet potato. The same number contains a report from the Secretary of War upon the same subject. Congress allowed Dr. Perrine a grant of land in Florida for the purpose of raising Sisal and other hemp plants. His death defeated the enterprise.

Allium Canadense, W Onion-tree; meadow garlic. Grows in damp soils; Newbern.

Griffith, Med. Bot. 653. It is employed as a substitute for the common garlic, and it is said to be fully as efficient.

Its top bulbs are greatly prized for pickling, being considered of superior flavor to the common onion for that purpose. For cultivation, see Farm. Encyc., G. W Johnson. Most of the exotic alliaceous plants, the leek, onion, garlic, etc., are cultivated in the Confederate States. Cotton or wool wet with the juice of garlic, and applied in the ear, is said to relieve deafness. The juice or syrup is given to infants with colic; a few drops being used in place of paregoric. Said to be both stimulant and carminative.

Allium Carolinianum. Wild garlic.

Several species of alliaceous plants grow within the Confederate States. The juice of garlic acts medicinally as an expectorant. It is a strong cement for broken glass and china. Preparations of garlic will expel snails, grubs, moles, worms, etc., placed near their haunts. Wilson's Rural Cyc.

Schoenolirion Michauxii, Torr. Swamps and pine barrens; Florida, and westward. Chap.

The bulbous roots of this and the *Nolina Georgiana*, Mx., are allied to the squill, and should be examined.

Aletris farinosa, L. Star-grass; unicorn root. Diffused in damp pine lands; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Big. Am. Med. Bot. iii, 92; Pe. Mat. Med. and Therap. ii, 121; Frost's Elems. 283; Mér. and de L. Dict. de Mat. Méd. i, 161; Lind. Nat. Syst. Bot. 353; Clayton's Phil. Trans. Ab. viii, 333; Cutler, Am. Acad. i, 435; Griffith, Med. Bot. 623. "The root is tonic and stomachic in small doses, but one of twenty grains occasions nausea, with a tendency to vomit." Lind. Nat. Syst. Bigelow knew of no plant exceeding this in genuine, intense, and permanent bitter. Pursh says it is an excellent remedy in colic; Cullen, in chronic rheumatism; and Dr. Thacher, in dropsical affections. Infused in vinegar, it is given in intermittent fever attended with dropsical accumulations.

The decoction of the root and leaves in liberal doses is much employed in popular practice in the lower portions of South Carolina. The root is quite resinous, and is supposed to contain a portion of extractive matter, hence its use in coughs and colds, as it does not at the same time impair the tone of the digestive organs. It is said to produce soreness of the mouth. Ten grains act as a tonic. The tincture is the strongest preparation. It is employed by the vegetable practitioners. See Howard's Imp. Syst. Bot. Med. 285.

Aletris aurea, Walter. Yellow star-grass. Grows in similar situations; collected in St. John's, Berkley, near Pinopolis; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, i, 39; Frost's Elems. 283; U. S. Disp. 67 It is purgative and nauseating in large doses, probably possessed of properties similar to the above.

Convallaria majallis. Lily of the valley. According to Elliott, grows on the highest mountains of South Carolina.

Bull. Plantes Vén. de France, 164. The powder of the leaves is said to be a very active sternutatory. Dém. Élém. de Bot. by Gillibert, ii, 6. Some practitioners order the powder of the leaves in epileptic affections, depending upon verminous influence. The flowers furnish a good deal of essential oil. "We have tried with success a powder of the flowers in inveterate pain of the head." Trans. from *op. cit.* This was taken in the nostrils as snuff. Dr. Wood, in the U. S. Disp. 1249, confirms the assertion in reference to the power the flowers possess of exciting sneezing. They have a delightful odor, resembling that of musk, and when dried and powdered are much employed as a sternutatory, acting sometimes quite violently. According to Mérat they are esteemed in nervous headaches and vertigo; and when pulverized are emetic and purgative. See Diss. Botanico Med. Inaug. de Lilium. Conval. 1718, Al Torfii; Diss. Inaug. at Gottingen, 1757; one by Misdorf, in 1742; and another by Schultze, in the same year. Shec,

in his Flora Carol. 431, states that the dried flowers are narcotic. "The extract of the root and flowers possesses a purgative properties similar to aloes." The poultice of the root enjoys some celebrity for taking away the marks of bruises, etc. With the addition of lime to the leaves a beautiful green color is obtained. The dose of the simple distillation of the flowers is four ounces; when powdered sixty grains; of extract two to three grains. The berries are large, and scarlet colored. The plant is much admired and cultivated throughout Europe. The dried flowers have a narcotic odor, and when pulverized they provoke sneezing, and may be used as a sternutatory. Rural Cyc.

Convallaria multiflora, } Solo-
Polygonatum multiflorum, Desfont. and Ell. Sk. } mon's seal. Grows in damp soils.

U. S. Disp. 1249. This is used in similar cases with the European species (the *Con. polygonatum*), the root of which was employed as a cosmetic, and which according to Hermann is a good remedy in gout and rheumatism. See Nouv. Journal de Méd. v, 209. Thirty grains of the dried root is given in Russia as a preventive against plague. Bull des Sc. Méd. v, 209.

Polygonatum biflorum, L. } This, *Convallaria majalis* (lily
P. pubescens, Pursh. } of the valley), and species of the genus *Smilacina* (Solomon's seal), growing in the Confederate States, yield starch from their roots. I have often noticed the tuberous roots of *Convallaria biflora*. Starch is abundant in them.

Uvularia perfoliata, L. Grows in damp soils; collected in St. John's. Fl. June.

Griffith's Med. Bot. 641. The roots of the different species are subacid and mucilaginous when fresh; and a decoction of them has been employed as a domestic remedy in sore mouth and in affections of the throat; also considered as alexipharmic in snake bites. The roots are, how-

ever, edible when cooked, and the young shoots are a very good substitute for asparagus. See, also, *Smilax*.

Uvularia sessiliflora, L. Collected in St. Stephen's parish, in damp soils. Fl. July. Similar in properties to the above.

Asparagus officinalis, L. Ex. Nat. on banks of Cooper river; vicinity of Charleston, Bach. Fl. May.

Mér. and de L. Dict. de M. Méd. Supplem. 1846, p. 73. A preparation in the shape of a syrup was much in vogue as a powerful sedative in palpitation of the heart, used by Broussais. Journal de Pharm. xix, 667. Its diuretic property is well known. Revue Méd. 1838, p. 409. See M. Lodiberts on its culture, and an account of the alcoholic fermentation from the branches, in the Journal de Méd. Militaire.

Asparagus for coffee.—Liebig states that asparagus contains, in common with tea and coffee, a principle which he calls *taurine*, and which he considers essential to the health of those who do not take strong exercise. By this a writer in the London Gardener's Chronicle was led to test asparagus as a substitute for coffee. He says: "The young shoots were not agreeable, having an alkaline taste. I then tried ripe seeds, and they, roasted and ground, make a full flavored coffee, not easily distinguished from fine Mocha. The seeds are easily freed from the berries by drying them in a cool (warm, I suppose he means) oven, and then rubbing them on a sieve. There is in Berlin, Prussia, a large establishment for the manufacture of coffee from acorns and chiccory, the articles being made separately. The chiccory is mixed with an equal weight of turnips to render it sweeter. The acorn coffee, which is made from roasted and ground acorns, is sold in large quantities, and frequently with rather a medicinal than an economical view, as it is thought to have a wholesome effect upon the blood. Acorn coffee is, however, made and used in many parts of Germany for the sole purpose of adulterating genuine coffee." Annual of Scientific Discovery.

COMMELINACEÆ. (*The Spiderwort Tribe.*)

Commelina communis, Pursh. Grows in pine barrens; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. ii, 272. In Cochin China it is said to be employed as a refrigerant and relaxant; prescribed in constipation and strangury. The flower is of a beautiful blue, and Kæmpher says that a color like *ultramarine* might be obtained from it.

ALISMACEÆ. (*The Water Plantain Tribe.*)

All are aquatic plants, and many contain a fleshy rhizome which is eatable.

Sagittaria sagittifolia, Mich. } Arrow-head. Grows in
" *latifolia*, W } rice fields; collected on Cooper river; I have specimens from Sumter district; vicinity of Charleston, Bachman; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 153; Journal Comp. des Sc. Méd. xix, 143. The leaves are acrid, and it is proposed to employ them in dispersing scrofulous ulcers. Dém. Élém. de Bot. ii, 416. The Chinese are said to cultivate it on account of the bulbous roots, which are eaten. It was employed as food by the Indians. Wade's Pl. Rariores, 80. It is said that the leaves, applied to the breasts of nursing women, will tend to dispel the milk. Griffith's Med. Bot. 619. The fecula is like arrow-root (*Maranta arund.*), and has been used for similar purposes.

The root of this plant is often of great length. In China it is used as an article of food. No doubt it contains starch. Our canna (*C. flacida*) very probably yields starch, for the arrow-root, "*tous les mois*," from *C. coccinea*, makes a stiffer jelly than that from the *Maranta* or Florida arrow-root.

Alisma plantago, L. } Water plantain.
A. trivialis and *parviflora* of Pursh. } Ditches and ponds; Georgia, and northward.

It is used by the vegetable practitioners as a demulcent

astringent in affections of the bowels, and by the "Cherokee doctors" as an external application to "sores, wounds, bruises, swellings, etc.," being employed as a poultice and wash.

JUNCEÆ. (*The Rush Tribe.*)

Juncus communis, Mey, in Kunth's En. Pl. } Soft rush; bul-
" *effusus*, Linn. and Ell. Sk. } rush. Grows in bogs and morasses; Newbern. Fl. May.

Lind. Nat. Syst. 531. Cultivated in Japan for making floor mats, chair bottoms, etc. It is sometimes employed in South Carolina for similar purposes. The pith, when dried and oiled, will serve as a wick. A decoction of the plant is said to be diuretic.

SMILACEÆ. (*The Smilax Tribe.*)

Smilax pseudo-China, L. China-briar. Grows in swamps, along streams; collected in St. John's, Berkley; Newbern. Fl. May.

Ell. Bot. Med. Notes, ii, 700; U. S. Disp. 634; Pe. Mat. Med. and Therap. 133; De Cand. Prodrom. i, 351; Frost's Elems. Mat. Med. 228. The decoction is alterative; in large doses emetic. It is much used in portions of the Confederate States in the composition of diet drinks, and it is considered one of the best substitutes for sarsaparilla. Griffith, Med. Bot. 660, states that the Indians employed the fecula of this, as well as that of the *S. caduca, laurifolia,* and *tamnoides*—all indigenous to South Carolina.

The roots of this plant contain a good deal of starch. They are, consequently, to a certain extent light and porous, and are used to make pipes with, also by our soldiers in camp in the manufacture of an extemporaneously prepared beer. The root is mixed with molasses and water in an open tub, a few seeds of parched corn or rice are added, and after a slight fermentation it is seasoned with sassafras. The young shoots of the China-briar are eaten as asparagus, with which they are closely allied. They impart the same odor to the urine, and probably contain *asparagine.*

Lawson, in his "Travels in Carolina," says: "The root is a round ball, which the Indians boil and eat." Croom states in the notes to his "Catalogue," p. 48, that these roots become in time of scarcity an important article of food to the southern Indians. The Seminoles, of Florida, obtain from them, by maceration in water, their red meal, and from the roots of *Zamia integrifolia* their white meal, "which have subsisted them in part during their late campaign."

The seeds of the berries are exceedingly hard, and are used as beads. I have seen a necklace made with them resembling coral, which may well be called "Indian coral."

Smilax sarsaparilla, L. } Rich soils; Abbeville district;
" *glauca*, Walt. } Fl. July.

U. S. Disp. 634; Woodv. Med. Bot. 161. This does not appear to be the officinal sarsaparilla, though it probably shares the alterative virtues belonging to the genus. Thornton's Fam. Herbal, 241; Journal de Pharm. xvi, 38; Frost's Elems. Mat. Med. 223. It is supposed to be possessed of undoubted efficacy, given in diet drinks and alterative mixtures combined with the China-briar, and used in syphilis and chronic rheumatism. Mér. and de L. Dict. de M. Méd. iii, 79; Humboldt's Voyage, viii, 378; Analysis in Journal de Chim. Méd. i, 215. A principle has been derived from it, called *smilacine*. Journal de Pharm. xvi, 501, and xviii, 324. From Bartley's examination, in the Edin. Med. Journal, xvi, 473, the virtues appear to reside in the cortical part; hence, it is best extracted by the cold infusion. Biblioth. Méd. xxvi, 119. According to these writers, it is considered a powerful sudorific and alterative, indicated when you wish to produce diaphoresis, as in rheumatism of the joints; and this agrees with the experience of those who have tried it in the Confederate States. J. Pope, Recherches upon the different species of Sarsaparilla, in Journal Gén. de Méd. xci, 300, and Thunberg's Mem. on the quantity of extractive matter furnished by the species.

Smilax caduca, L. Around ponds, and in rich shaded

soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 375. Some have asserted that it furnishes caoutchouc. See Hist. Nat. Pharm. ii, 590.

Smilax tamnoides, L. Grows in dry soils; collected in St. John's; vicinity of Charleston. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 384. The root of this also, says Mérat, is employed in the form of decoction to purify the blood.

Smilax herbacea, L. Grows in rich wooded soils; collected in St. John's; vicinity of Charleston. Fl. June.

This species has been used for its alterative properties.

Smilax ovata, Ph. and Ell. Sk. Grows on the sea-shore, Ell.; vicinity of Charleston. Fl. June.

Ell. Bot. Med. Notes, ii, 698. Remarkable for the fragrance of its flowers.

DIOSCOREACEÆ. (*The Yam Tribe.*)

Dioscorea villosa, L. Wild yam. Grows in damp soils; collected in St. John's; vicinity of Charleston. Fl. July.

Griffith's Med. Bot. 659. The decoction of the root, according to Riddell, in a late paper, Synops. Flo. West. St. 93, is eminently beneficial in bilious colic: one ounce is added to one pint of water, and half of this is taken at a dose. He says it acts with great promptitude, and that Dr. Neville places much reliance on the tincture as an expectorant; it is likewise diaphoretic, and in large doses emetic. Attention is invited to its employment.

See illustrated papers in Patent Office Reports, p. 169, 1854, and p. 250, 1856, on the Chinese yam (*Dioscorea batatas*) which bears a large tuber, like the potato, and yields starch, sugar, etc. The roots do not require to be stored in cellars, though this may be done; they are dug in the fall. I have seen it growing at Col. J. B. Moore's, near State-

burg, S. C. The root is said to be "voluminous, rich in nutritive matter, and can be cooked in every respect like the common potato, and even be eaten in the raw state." The yam cultivated at the South is *Dioscorea sativa*; another species raised here, *D. alata*, weighs sometimes thirty pounds.

ARACEÆ. (*The Arum Tribe.*)

An acrid principle generally pervades this tribe, existing in some of them to a high degree.

Arisæma atroreubens, Blum. in K'th's En. Pl. }
Arum triphyllum, L. Ell. Sk. } Wake robin; Indian turnip; dragon-root.

Grows in rich soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. June.

Eberle, Mat. Med. ii, 437; Chap. Therap. and Mat. Med. ii, 41; U. S. Disp. 123; Pe. Mat. Med. and Therap. ii, 78; Big. Am. Med. Bot. i, 52; Am. Journal Pharm. xv, 83; Thacher's U. S. Disp., art. *A. triphyllum*, 153; Cullen, Mat. Med. ii, 211 and 554; Mér. and de L. Dict. de M. Méd. i, 460; Coxe, Am. Disp. 121; Schœpf, Mat. Med. 133; Rush, ii, 301; Barton's Collec. 29; Shec. Flora Carol. 273; McCall, in Phil. Med. Journal, ii, 84; Cutler, Am. Acad. i, 487; Lind. Nat. Syst. Bot. 364; Matson's Veg. Pract. 295, and Thompson's Steam. Pract. It is said to be similar in its action to the *A. maculatum*. Dr. Meara affirms that it does not act on the general circulatory, but only on the glandular system, which it stimulates greatly, and the secretions of which it augments. Dr. Wood says it stimulates the secretions of the skin and lungs also. It is used advantageously in diseases of the mucous membranes, particularly pertussis and asthma. "In the chronic asthmatic affections of old people it is a remedy of very considerable value." The powder of the fresh root, made into a paste with honey or syrup, and placed in small quantities upon the tongue so as to be gradually diffused over the mouth and throat, is said to have proved useful in the aphthous sore throat of children. Dr. Thacher em-

ployed it in this affection, and adds that it is of approved efficacy in rheumatism. "Milk in which the acrid principle of the *A. triphyl.* has been boiled has been known to cure consumption!" De Cand. cit. in Lind. The sliced root has been used as an application for poisoning by the ivy (*Rhus*). Lindley remarks of some of this class that "the spadixes disengage a sensible quantity of heat when they are about to open." An ointment, made by stewing the fresh root in lard, is applied in scald-head, in ringworm, and other eruptions and cutaneous diseases, acting as a stimulant. The root is a decided expectorant. Agardh considers that the acrid principle, which, notwithstanding its fugacity, has lately been obtained pure, is of great power as a stimulant. In corroboration, I would mention my having produced vesication merely by rubbing the stem of the *Arum Walteri* (South Carolina species) in contact with the unbroken skin; and I observe that both species are very irritating to the fauces. By chemical analysis (Am. Journal Pharm. xv, 83) it contains, besides the acrid principle, from ten to seventeen per cent. of starch, which may be obtained from it as white and as delicate as from the potato; also albumen, gum, sugar, extractive, lignin, and salts of potassa and lime. Bigelow states (i, 59) that the starch is prepared by pouring repeatedly portions of water over the fresh root reduced to a pulp by grating, and placed on a strainer, the farinaceous part being carried through, and leaving the fibrous behind. Dr. McCall, of Georgia, found it to yield one-fourth part its weight of pure amylaceous matter, which is white, delicate, and nutritive. See, also, the experiments of Bigelow to extract the acrimonious principle of the fresh root. The root may be preserved if kept buried in the sand. Dose of recently dried root, ten grains mixed with gum-arabic, sugar, and water, in the form of emulsion, repeated and increased. During scarcity of food almost any substance that contains starch, even though it be associated with bitter or noxious principles, may furnish material for bread. "From the acorn a kind of meal is produced which makes excellent

bread, provided that a little barley meal be mingled with it to counteract its astringent qualities. M. Parmentier extracted the farina or starch of the bryony, the iris, gladiolus, ranunculus, fumaria, arum dracunculus, mandragora, colchicum, filipendula, and hellebores, etc. It is only necessary to cleanse these roots, to scrape and pound them, and then to soak the pulp in a considerable quantity of water; a white sediment is deposited, which when washed and dried is a real starch. M. Parmentier converted these different starches into bread by mingling them with an equal portion of potatoes reduced into pulp, and the ordinary dose of wheaten leaven; the bread had no bad taste, and its quality was excellent." Wilson's Rural Cyc. We have in the Confederate States several species of the genera mentioned above. See index to this volume; also, "*Zizania*," or Canada rice. A knowledge of these plants may prove serviceable in case of an emergency.

Peltandra Virginica, Raf. (Kunth, En. Pl.) }
Arum Virginicum, L. } Common in swamps; collected in St. John's, Berkley; vicinity of Charleston. Fl. May.

Stearns' Am. Herbal, 133. Property probably similar to those of the above. "Powerfully stimulant, diuretic, and diaphoretic. Stimulates the solids, promotes the secretion of perspiration, urine, etc.; good in languid, phlegmonous habits, in relaxation and weakness of the stomach, loss of appetite, in jaundice, hysterical and hypochondriacal complaints, rheumatism, pains, and obstinate headaches unattended with fever." Dose, ten grains, with sixty grains of gum-arabic, twenty of spermaceti, and eight of sugar.

Arum maculatum. I find that this species is not a native of the Confederate States; but the indigenous *A. triphyllum* is said to possess precisely the same properties; so I will allow it to remain.

Bull. Plantes Vén. de France, 83. "The leaves, being

eaten by three children, produced horrible convulsions," swelling of the tongue, etc. One author mentions that he uses the root with great success in rheumatic pains, in doses of six to twenty grains of fresh root, three times a day. The emulsion is more sedative. The dry root is quite nutritious, serving as an article of food. Catalogus Plantarum, 28. The decoction of the root with honey is a powerful expectorant, and is useful in asthma. (*Expectorat enim validissime crassas lentasque excreationes.*) The Catalogus Plantarum of Ray, furthermore, expresses this high opinion: "*Remedium est præstantissimum et minime fallax adversus venenum et pestem, asthmaticos maxime juvat, hernias curat et urinam ciet.*" See, also, the Historia Plantarum Raii, p. 1208. The root, dried and powdered, has been sold as a cosmetic, under the name of cypress powder; said also to possess a soporific quality, and to be used in washing linen. Linn. Veg. Mat. Med. 168; Woodv. Med. Bot. 75. The recent root, according to Orfila, will cause the death of a dog in thirty-six hours. Toxicol. 298; Ancien. Journal de Méd. xxxiv, 529. See Dict. des Drogues, i, 355, for chemical analysis. Portland sago is made from the root. Encycl. Plants, 800. The bad effects resulting from the use of the *Arum* are alleviated by the administration of buttermilk and oily liquors. Shecut, in his Flora Carol., speaks of its great reputation as an effectual remedy in cachectic cases, in weakness of stomach, and fixed rheumatic pains. The fresh root, externally applied, is a good substitute for Spanish flies. Dr. Lewis, in the Fam. Herbal, 751, asserts that neither water nor spirit extracts its virtues, the fresh root being best administered in substance, in the form of a bolus or emulsion, or by heating it up with resin or gum, and keeping in pill. Geoffroi alludes to it as a valuable stomachic, for restoring lost appetite; useful in chlorosis, jaundice, and hysterical affections. He says that by boiling the root in vinegar it becomes powerfully diuretic. Bergius reports the root as of great service, mixed with an alkaline aromatic, in cases of obstinate periodical headache, when the pulse is slower than natural without fever. Journal de

Pharm. xii, 158. Mérat, in the Dict. de Mat. Méd., endorses the opinions generally expressed above. U. S. Disp. 123; Big. Am. Med. Bot. i, 52. Sir J. E. Smith, in his Introd. to Botany, says that it is asserted by ——— that at the period of inflorescence, between 4 and 10 o'clock, P. M., the flower is actually "hot," causing the thermometer to rise several degrees.

Symplocarpus fœtidus. (*Pothos* of Mx.) Skunk cabbage. A fetid plant, supposed to possess some antispasmodic power. The root, chewed, produces a prickling sensation in the mouth.

Orontium aquaticum, Mx. Golden-club. Roots often immersed; common in lower country; collected in St. John's. Fl. May.

Lind. Nat. Syst. 365. "The root is acrid, but becomes eatable by roasting." Both the seeds and roots were eaten by the Indians.

TYPHACEÆ. (*The Bulrush Tribe.*)

Typha latifolia, L. Cat-tail; reed mace. Morasses and stagnant waters, often immersed; collected in St. John's; vicinity of Charleston; Newbern.

Mér. and de L. Dict. de M. Méd. t. vi, 795; Journal de Chim. Méd. iv, 179; Journal de Pharm. xii, 564. This plant receives an extended notice in European works. The root is eaten as a salad. See, also, Lightfoot's Fl. Scotica, ii, 339. A jelly also is extracted from it. Aublet assures us it is good in gonorrhœa and chronic dysentery. See an analysis in Journal de Pharm. xii, 564, and xiv, 221. Little crystals of phosphate of lime are found in the stems. It is said also to be abundant in fecula. Découv. des Russes. iii, 450; Gmélin, Flora Siberica, i, 25–139. See Vignal's Essay on the treatment of wounds with the pollen or aigrettes of the *Typha*, which it is proposed to use as a substitute for cotton (in French). Paris, 1803. The bark has been employed in the fabrication of hats, and with cotton in making

gloves; and some have recommended it in making China paper. See the Dict. de M. Méd. The down has been used to stuff mattresses. Linnæus informs us that the coopers in Sweden employ the stalks to bind their casks with. In England they use the *Scirpus lacustris*, and in Italy the *Carex acuta* (all South Carolina species, which see) to fasten the timber in the joints. The stalks are opened longitudinally, and placed between the interstices, so as effectually to prevent the escape of fluids. Those who manufacture turpentine and rice barrels might find these plants of much service in this respect—serving the purpose much better than the strips of wood shaving generally employed to render the seams tighter. I would invite further attention to the *Typha* for the several purposes alluded to. It is stated (Courier, 1863) that paper is made from this plant in New York.

Sparganium ramosum, Huds. } Lagoons and ditches;
S. Americanum, Ell. } Florida, and northward.

The herbage of the branchy species of burr-reed (*Sparganium*) is softer and more pliant than that of the reedy plants, and serves well in combination with some of them in packing. I have been surprised that more use is not made of such plants by merchants and packers. The unripe burrs are very astringent; a strong decoction is employed for various purposes as an astringent. See Darlington's Flora Cestrica.

Acoraceæ.

Acorus calamus, L. Sweet-flag; calamus. Diffused in bogs and morasses; I have collected it in Fairfield and in Charleston districts; vicinity of Charleston, Bach; Newbern.

Le. Mat. Med. i, 251; Pe. Mat. Med. and Therap. ii, 76; Royle, Mat. Med. 602; Hoffmann's Obs. Phys. Chim. i, obs. i; Ell. Bot. Notes, i, 403; U. S. Disp. 145; Ed. and Vav. Mat. Méd. 281; Ball. and Gar. Mat. Med. 431; Bergii, Mat. Med. 287; Mér. and de L. Dict. de M. Méd. i, 63; Woodv.

Med. Bot.; Ann. de Chim. lxxxi, 332; Coxe, Am. Disp. 18; Shec. Flora Carol. 96. This is a very pleasant, aromatic stimulant and stomachic; esteemed as a stimulating tonic in atonic conditions of the stomach and bowels; in the East as a powerful aphrodisiac and carminative. Ed. and Vav. state that it has been administered successfully in intermittent fever: "On l'a beaucoup vanté pour combattre les symptomes cérébraux qui accompagnent la seconde période des fièvres dites ataxiques." Dr. Thompson says, from his own experience, he finds it one of the most useful adjuvants to bark and quinine; given also, combined with magnesia, in the flatulent colics of infants. In the Supplem. to Mér. and de L. 1846, 10, Dr. Endelicher assures us that the root is an excellent remedy in chronic gout: "qu'elle apaise les douleurs, qu'elle assouplit les articulations"—administered in powder, from eighteen to twenty grains every two hours. Annal. de Méd. and note, sur quelques plantes de l'Aube, Mém. de l'Aube, 1841. The fresh root, candied, is said to have been employed in large quantities as a preservative in epidemic diseases. Thornton's Fam. Herb. 354. The root is used in vertigo. Linn. Veg. M. Med. 64; Griffith, Med. Bot. 620. See Anal. by Trommsdorf; Ann. Clinique, xvii. From which it appears to contain volatile oil, resin, extractive, etc. Thompson, in his M. Med., says that the oil differs from other volatile oils in not dissolving iodine.

The root of this powerfully aromatic plant is much used as a flavoring substance throughout the Western states for making bitters, particularly the compound tincture of gentian. See treatises on the Mat. Med. "It is a principal medicament in the preparation of the medicated malt liquors called herb ales, and is supposed to be the ingredient used by the French for giving flavor to their snuff called *à la violette.* The whole plant has been used for tanning leather, and in Poland it is strewed on the floors of the upper and middle classes of society when they are about to receive company, in order that the leaves may be bruised by the feet of the guests, and fill the rooms with

an agreeable odor." Rural Cyclopædia, p. 40. The dose of the root is from ten to twenty grains. An infusion of the root is made with one ounce to one pint of boiling water. Dose, a wineglassful.

NAIADACEÆ. (*The Pond-weed Tribe.*)

Zostera marina, L. Eel-grass. West Florida, and northward; deep salt water coves. Chapman. Not in any catalogue of the plants in St. John's, S. C.

This marine herb with creeping stems is just attracting great attention in England (1862) as a substitute for cotton. The result is doubtful, as the amount to be obtained is perhaps inadequate. The papers are filled with accounts of the plant.

Substitutes for Cotton.—The London Index says:

Some new "substitute for cotton," which is to cost nothing, to make the fortune of the inventor, and to reopen the mills of Lancashire, is discovered every week. The inventors are mostly persons who know nothing of cotton spinning, and they forget, invariably, that a material which costs nothing when supposed to be useless and gathered by handfuls might become almost as dear as silk if there were a manufacturing demand for hundreds of millions of pounds weight of it. The following remarks by a "Medallist in Botany" deserve notice:

"I have obtained samples of most of the fibres proposed, and I have submitted them to careful examination under the microscope. I find them all to be varieties of woody fibre, more or less split up or divided, varying in the length and thickness of the fibrillæ. The fibres of all the specimens I have seen are nevertheless uniform in the following particulars: they are all solid and inelastic or brittle, with joints and rough edges, showing where the bundles of fibrillæ have been torn apart. Having some practical acquaintance with cotton spinning and weaving, I assert that the above qualities render woody fibre unfitted to be used as a substitute for cotton without a considerable modification of our machinery. The fibres which have been

exhibited may probably be useful as substitutes for linen, if they can be largely produced at a cheap rate; but the woody fibre (from which all the proposed substitutes, I feel confident, are drawn) can never be a perfect substitute for cotton, which consists of vegetable hairs, hollow, elastic, ribbon shaped, and spiral, with smooth edges and surfaces. If we want a substitute for cotton we must not look for it in woody fibre."

PISTIACEÆ. (*The Duckweed Tribe.*)

Spirodelia polyrrhiza, Schleid. in Kunth's En. Pl. } Water
Lemna " W and Ell. Sk. } flaxseed.
Santee canal. Fl. July.

Lightfoot's Fl. Scotica, ii, 538. The "leaves sink to the bottom of the water in winter and rise in the spring." The *Lemna* or duckweed destroy fish by covering so closely the surface of ponds as to exclude the air.

Zea Mays. Maize; Indian corn. (Introduced in this place irregularly.)

Corn is certainly one of the most nutritious of the cerealia with which man has been blessed. In one hundred pounds of corn there are ten of oil; the grain and meal are prepared in a great variety of ways, and the whole plant adapted to many useful purposes in the arts, in medicine, and in domestic economy. The article *Zea*, in the Rural Cyc., is full of information compiled from numerous authorities; he refers to the manufacture of coarse paper from the husks. Blade tea is quite a favorite diaphoretic used recently by many in the Confederate States in fever—its antiperiodic properties doubtful. Corn meal rubbed into fresh meat will preserve it fresh several days during hot weather; a light covering with bran or a series of dustings with oatmeal will be equally efficient—methods so easily put in practice that a knowledge of them may prove serviceable at present.

In the Patent Office Reports, 1855, p. 158, there is a communication on "Bread crops," on the value and use of

the maize as an article of food, on its preparation for bread in place of wheat flour, and on the economy of mixing rye with corn. It is stated from a foreign report that a "bread composed of two-thirds rye and one-third maize is about ten per cent. cheaper than bread made of pure rye." A method is given to prevent the souring of maize flour. In our armies it is a universal subject of complaint that corn meal, or flour, is not given to the soldiers in place of wheat, as it is nutritious and much more easily and better cooked. Besides, the Southern soldier is for the most part more accustomed to corn bread. The "Boston brown bread," a useful hygienic preparation, contains two parts of corn to one of rye meal, and is made in the following manner: "To three quarts of mixed meal are added a gill of molasses, two teaspoonfuls of salt, one teaspoonful of saleratus, and either a teacupful of home-brewed or half a teacupful of brewer's yeast. This bread continues good and wholesome as long as any other bread is usually kept; but like other preparations of corn it is preferred warm, and is generally eaten fresh, or after being toasted. Like all other kinds of corn bread it is an acceptable substitute not only for the bread made of other grains but for the vegetables which use has made desirable at the noonday meal."

A chemical analysis of the corn-cobs is given by Prof. C. T. Jackson, volume Patent Office Reports, 1855, p. 163, and a paper on green corn for fodder, p. 168. It may be planted as a substitute for northern hay. "The amount of green food which may thus be grown under favorable circumstances seems almost incredible. An acre contains forty-three thousand five hundred and sixty square feet; if, therefore, but one such stalk were to grow upon each foot, there would be over seventy-six tons produced to the acre." The Northern varieties are recommended to be planted at the South for this purpose. Land that will produce two tons of hay will yield, it is supposed, ten tons of corn fodder for leaves, roots, etc., suitable for man and horse in periods of scarcity. See "*Alopecurus*" and "*Anthoxanthum*," in this volume.

Mr. J. H. Salisbury, in a prize essay published by the New York State Agricultural Society, and quoted in Norton's Elements of Practical Agriculture, states that there is in the cob of this grain two per cent. of gluten and gum, and one or two per cent. of sugar, with a little starch. It has, therefore, some importance of its own as food. In Patent Office Reports, 1848, p. 355, it is stated in a report from Richmond, Massachusetts, that "corn-stalks, well secured and cut fine, furnish an agreeable and healthy food for horses and neat cattle; for the latter, if when cut they are scalded by pouring on warm water, they are almost equal to what they are when green, especially for cows, causing them to produce milk of almost the richness of June. They are worth when well cured six dollars per ton, when hay is worth ten dollars; straw is worth from four dollars and fifty cents to five dollars per ton. Large quantities of straw are annually manufactured into paper, and the demand for this purpose probably increases its price some fifteen or twenty per cent."

On the subject of general economy, in absence of supply of Northern hay, I introduce the following in an article on corn-stalks for fodder by a correspondent of the Country Gentleman, 1861. It is advised to be cured, cut up entire, and fed to cattle. The editor of the Southern Field and Fireside says: "For the last six years, while residing on a farm in Georgia, we have followed the Northern plan of cutting up corn near the ground, curing the stalks and corn in shocks, then husking or shucking the corn, and feeding the stalks and blades together. This we regard as much better economy than to pull fodder and leave the whole stalks in the field. If we had many cattle to feed, we should procure a machine for cutting the stalks, steam them a little, and add a little meal of some kind. We have fed dairy cows in this way with satisfactory results. Good clover hay is worth more than any corn fodder for cows and horses, pound for pound." See, also, same paper, May 4, 1861, for article on cultivation of hay. Corn-stalks are also very useful as manure, when composted with a little

caustic lime, as it is a plant-food of considerable value. "Dr. Spengle found eighty-eight pounds of ashes in one thousand pounds of corn-stalks. Corn-cobs are rich in potash, and yet one often sees them wasted in wood-lots or the highway." The cob yields almost as much ashes as the tobacco plant.

In the Richmond Examiner, 1862, a lady of Fluvanna county, Virginia, communicates the following substitute for soda: "To the ashes of corn-cobs add a little boiling water; after allowing it to stand for a few minutes, pour off the lye, which can be used at once with an acid (sour milk or vinegar). It makes the bread almost as light as soda." I have seen this preparation made and used in St. John's, South Carolina, 1862. It is, strictly speaking, a potash mixture, has precisely the taste of a strong solution of bi-carbonate of potash, and could be used in cough mixtures to correct acidity, and wherever an alkaline solution is required. It would also serve the purposes of "concentrated lye." The bread made with it is excellent. For manufacture of *soda*, see "*Salsola kali.*"

An economical mode of making *soap* with corn-shucks, which a correspondent in the Southern Field and Fireside, March 8, 1862, says "has been tried and approved by several persons," I insert as follows: "Take one gallon of strong lye, add a half-pound of shucks, cut up fine. Let the shucks boil in the lye until they are reduced to shreds. Then fish the shreds out, and put half a pound of crackling grease in, or six ounces of lard, and boil until it is sufficiently thick to make good soap." The amount of potash in the blade and shuck of corn observed in the table I have inserted from Ure's Dictionary may explain the value of this substance. I am informed that soap has been made satisfactorily from the corn-shuck, as above described, in Sumter district, South Carolina. I will add the following: to make twenty pounds of cheap, hard soap from four pounds, the Southern Field and Fireside directs four pounds of turpentine soap, half-pound of soda, add two gallons of water, boil ten minutes, add a spoonful of salt,

and boil ten minutes more. I insert the following, believing that the ashes of the corn-cob, on account of the potash it contains, would serve in place of those from hickory:

Preserving Meat.—Ashes prepared from green hickory wood, combined with salt in the proportion of one-third to two-thirds by measurement, and applied in the ordinary way of salting meat, in ordinary quantity, will save pork fully as well as salt alone, and give a delicacy of flavor to bacon made from it which saltpetre or sugar pickle will not impart. Mix the ashes and salt thoroughly, in the above proportions, and use the mixture as salt alone is commonly used. There is no experiment in this, and no one need hesitate to rely on it.

Beer may be made from corn thus: "Take one pint of corn and boil it until it is soft, add to it a pint of molasses and one gallon of water; shake them well together and set it by the fire, and in twenty-four hours the beer will be excellent. When all the beer of the jug is used add more molasses and water. The same corn will answer for months, and the beer will be fit for use in twelve hours by keeping the jug where it is warm. In this way the ingredients used in making a gallon of beer will not cost over six cents, and it is better and more wholesome than cider. A little yeast greatly forwards the working of the beer." Agricultural paper. To make *small beer:* "Nine quarts of water, three pints of bran, and a few hops; strain and cool to milk-warm, then put in a few raisins, one pint of molasses, let them stand one night, and strain and bottle it."

An excellent substitute for coffee.—For a family of seven or eight persons, take a pint of well toasted corn meal and add to it as much water as an ordinary sized coffee-pot will hold, and then boil it well. We have tried this toasted meal coffee, and prefer it. Many persons cannot drink coffee with impunity, and we advise all such to try the receipt. They will find it more nutritious than coffee, and quite as palatable. The above is from a correspondent of the Raleigh Register. See rice (*Oryza sativa*) for the use of corn and rice as substitutes for coffee.

The "newspapers" (1862) continue to report that "blade tea" is excellent in fevers, and that "*raw corn meal*, mixed with water to drink, removes superfluous bile and cures fever!" "Green corn and wheat make useful starch, and rice starch gives lawns and colored articles a look of newness unsurpassed."

Oil of a fine quality is manufactured from corn. "It is said to burn with a clear, steady light, in every respect equal to sperm or lard oil, without the smoke which usually attends vegetable oils, and will not congeal in the coldest weather." A liquor, well known as corn whiskey, is also distilled from the fermented grain.

Thäer says "The use of unripe maize for the manufacture of sugar has lately been again recommended, on the ground that maize is better adapted for this purpose than beet root. I have long been of opinion that of all plants which can be raised in this country, maize is better suited to the purpose in question; the syrup extracted from it is before crystallization decidedly superior to that of the beet root." Principles of Agriculture, p. 485. In the Confederate States where the sugar-canes have been so generally introduced the problem may be differently solved. As it may become a matter of great interest I insert the following:

Making sugar of corn.—Extracts from the remarks on the manufacture of *corn sugar*, by Wm. Webb, of Wilmington, Delaware, May, 1862:

The raw juice of maize, when cultivated for sugar, marks 10° on the saccharometer, while the average of cane juice (as I am informed) is not higher than 8°, and beet juice not over 3° From nine and three-quarter quarts (dry measure) of the former I have obtained four pounds six ounces of syrup concentrated to the point suitable for crystallization. The proportion of crystallizable sugar appears to be larger than is obtained from cane juice in Louisiana. This is accounted for by the fact that our climate ripens corn perfectly, while it but rarely if ever happens that cane is fully matured. In some cases the

syrup has crystallized so completely that less than one-sixth part of molasses remained. This, however, only happened after it had stood one to two months. There is reason to believe that if the plant were fully ripe, and the process of manufacture perfectly performed, the syrup might be entirely crystallized without forming any molasses. Without any other means for pressing out the juice than a small hand mill, it is impossible to say how great a quantity of sugar may be produced on an acre; but the calculations made from trials on a small scale leave no room to doubt the quantity of sugar will be from eight hundred to one thousand pounds.

I have been informed by Mr. Ellsworth that Monsieur Pallas, of France, had discovered in 1839 that the saccharine properties of maize were increased by merely taking off the ear in its embryo state. An experiment, however, which I instituted to determine the value of this plan resulted in disappointment. The quantity of sugar produced was not large enough to render it an object. The reasons of this failure will be sufficiently obvious on stating the circumstances. It was found that taking the ear off a large stalk, such as is produced by the common mode of cultivation, inflicted a considerable wound upon the plant, which injured its health, and of course lessened its productive power. It was also found that the natural disposition to form grain was so strong that several successive ears were thrown out, by which labor was increased and the injuries to the plant multiplied. Lastly, it appeared that the juice yielded from those plants contained a considerable portion of a foreign substance not favorable to the object in view. Yet, under all these disadvantages, from one hundred to two hundred pounds of sugar per acre may be obtained. The manifest objections detailed above suggested another mode of cultivation, to be employed in combination with the one first proposed. It consists simply in raising a greater number of plants on the same space of ground. By this plan all the unfavorable results above mentioned were obviated, a much larger

quantity of sugar was produced, and of a better quality. The juice produced by this mode of cultivation is remarkably pure and agreeable to the taste. The sweetness of the corn-stalk is a matter of universal observation. Our forefathers, in the Revolutionary struggle resorted to it as a means to furnish a substitute for West India sugar. They expressed the juice and exerted their ingenuity in efforts to bring it to a crystallized state; but we have no account of any successful operation of the kind. In fact, the bitter and nauseous properties contained in the joints of large stalks render the whole amount of juice from them fit only to produce an inferior kind of molasses. I found on experiment that by cutting out the joints, and crushing the remaining part of the stalk, sugar might be made, but still of an inferior quality. The molasses, of which there was a large proportion, was bitter and disagreeable.

From one to two feet of the lower part of these stalks was full of juice, but the balance, as it approached the top, became dryer and afforded but little. From the foregoing experiments we see that in order to obtain the purest juice and the greatest quantity we must adopt a mode of cultivation which will prevent the large and luxuriant growth of the stalk. The planting should be done with a drilling machine. One man, with a pair of horses and an instrument of this kind, will plant and cover in the most perfect manner from ten to twelve acres in a day; the rows (if practicable, let them run North and South) two and a half feet apart, and the seed dropped sufficiently thick in the row to insure a plant every two or three inches. A large harrow, made with teeth arranged so as not to injure the corn, may be used with advantage soon after it is up. The after culture is performed with a cultivator, and here will be perceived one of the great advantages of drilling; the plants all growing in lines, perfectly regular and straight with each other, the horse-hoe stirs the earth and cuts the weeds close by every one, so that no hand-hoeing will be required in any part of the cultivation. It is part of the system of cane-planting in Louisiana to raise as full

a stand of cane upon the ground as possible, experience having proved that the most sugar is obtained from the land in this way. As far as my experience has gone, the same thing is true of corn.

The next operation is taking off the ears. Many stalks will not produce any; but whenever they appear they must be removed. Any time before the formation of grain upon them will be soon enough. Nothing further is necessary to be done until the crop is ready to be cut for grinding. The stalks should be topped and bladed while standing in the field. They are then cut, tied in bundles, and taken to the mill. The mills used for grinding the Chinese sugar corn will answer every purpose. The tops and blades when properly cured make an excellent fodder.

On the whole, there appears ample encouragement for perseverance. Every step in the investigation has increased the probability of success, no evidence having been discovered why it should not succeed as well if not better on a large scale than it has done on a small one.

1. In the first place it has been satisfactorily proved that sugar of an excellent quality, suitable for common use without refining, may be made from the stalks of maize.

2. That the juice of this plant, when cultivated in a certain manner, contains saccharine matter remarkably free from foreign substances.

3. The quantity of this juice (even supposing we had no other evidence about it) is sufficiently demonstrated by the great amount of nutritive grain which it produces in the natural course of vegetation. It is needless to expatiate on the vast advantages which would result from the introduction of this manufacture into our country.

The process which has been employed in the manufacture of maize sugar is as follows: the juice, after coming from the mill, stood for a short time to deposit some of its coarser impurities. It was then poured off, and passed through a flannel strainer, in order to get rid of such matter as could be separated in this way. Lime-water, called milk of lime, was then added, in the proportion of one or

two tablespoonfuls to the gallon. It is said by sugar manufacturers that knowledge on this point can only be acquired by experience; but I have never failed in making sugar from employing too much or too little of the lime. A certain portion of this substance, however, is undoubtedly necessary, and more or less than this will be injurious, but no precise directions can be given about it. The juice was then placed over the fire and brought nearly to the boiling point, when it was carefully skimmed, taking care to complete this operation before ebullition commenced. It was then boiled down rapidly, removing the scum as it rose. The juice was examined from time to time, and if there was any appearance of feculent particles which would not rise to the surface it was again passed through a flannel strainer. In judging when the syrup is sufficiently boiled a portion was taken between the thumb and finger, and if when moderately cool a thread half an inch long could be drawn it was considered to be done, and poured into broad, shallow vessels to crystallize. In some cases crystallization commenced in twelve hours; in others not till after several days; and in no case was this process so far completed as to allow the sugar to be drained in less than three weeks from the time of boiling. The reason why so great a length of time was required I have not yet discovered. There is no doubt that an improved process of manufacture will cause it to granulate as quickly as any other.

The stripping the ears from the corn is esteemed by some essential in the production of sugar, though not in the production of a much smaller quantity of excellent molasses. The principal labor consists in stripping off the leaves, which should be done before the stalks are cut. Dr. Naudain, of Delaware, says (So. Cult. p. 26, vol. i) that the corn should be planted as broom-corn is commonly planted —very close in the row, probably a stalk every four inches.

At a meeting of the French Academy M. Biot read the report of a committee, which paper contained the following statements: of the corn-stalks experimented upon the

ears had been removed from one portion and left to grow on others. The juice obtained from the stalks which had been castrated yielded twelve per cent. of sugar; that expressed from the stalks on which the ears had been permitted to grow thirteen per cent.; so that so far as France is concerned the results of former experiments may be fallacious. "The juice of maize contains as much if not a larger proportion of sugar than that of sugar-cane." Farmer's Encyc.

The reader interested will find the several numbers of Southern Cultivator, vols. i, ii, iii, and iv. See pp. 17, 19, and 25, and 90 of vol. i, a large number of papers on this subject. I regret that I can only refer to them. Hundreds of pounds of sugar were made by several persons. Six hundred to six thousand pounds can be made from one acre. It must be far easier to crystallize than that from sorghum. It has been advised to take off the tassel instead of the ear in order to increase the saccharine principle. Twenty-five gallons of juice make four gallons of syrup, and a gallon of juice will produce one and one-quarter pounds of sugar. The corn is not lost as fodder, and the salted refuse is also good. The boiling of the syrup should be commenced *immediately* after the corn is cut. The high price of sugar and molasses adds increased importance to this subject. I obtain the following from the Louisville Courier:

Paper.—The manufacture of paper from the leaves of Indian corn is becoming extensive in Austria. The paper is said to be tougher than ordinary paper made from rags, while it is almost wholly free from silica, which makes paper produced from straw so brittle.

If the above be true it is a discovery of immense importance to the United States. We consume more paper than any other nation, and have Indian corn to make it of. If Indian corn paper be tougher than rag or straw paper it is just what we need, and our already monstrous corn crop, which in 1850 was 592,071,000 bushels to 100,485,000 bushels of wheat, and is mainly devoted to feeding our immense

herds of live stock, will be greatly extended, and paper go down in price.

Paper from Indian corn leaves.—The London Daily Telegraph gives the following account of paper-making from Indian corn leaves, which promises to make a revolution in the paper business if only half is true that is stated, and we do not see any reason to doubt its correctness:

"Recent experiments have proved Indian corn to possess not only all the qualities necessary to make a good article, but to be in many respects superior to rags. The discovery to which we allude is a complete success, and may be expected to exercise the greatest influence upon the price of paper. Indian corn, in countries of a certain degree of temperature, can be easily cultivated to a degree more than sufficient to satisfy the utmost demands of the paper market. Besides, as rags are likely to fall in price owing to the extensive supply resulting from this new element, the world of writers and readers would seem to have a brighter future before it than the boldest fancy would have imagined a short time ago.

"This is not the first time that paper has been manufactured from the blade of Indian corn; but strange to say, the art was lost, and required to be discovered anew. As early as the seventeenth century an Indian corn paper manufactory was in full operation at the town of Rievi, in Italy, and enjoyed a world-wide reputation at the time; but with the death of its proprietor it seems to have lapsed into oblivion. Attempts subsequently made to continue the manufacture were baffled by the difficulty of removing the flint, and resinous, and glutinous matter contained in the blade. The recovery of the process has at last been effected, and is due to the cleverness of one Herr Moritz Diamant, a Jewish writing master in Austria, and the trial of his method on a grand scale, which was made at the Imperial manufactory of Schlogelmuhle, near Glognitz, Lower Austria, has completely demonstrated the certainty of the invention. Although the machinery, arranged as it was for the manufacture of rag paper, could not of course

fully answer the requirements of Herr Diamant, the results of the essay were wonderfully favorable. The article produced was of a purity of texture and whiteness of color that left nothing to be desired; and this is all the more valuable from the difficulty usually experienced in the removal of impurities from rags. The proprietor of the invention is Count Carl Octavio Zu Lippe Wessenfeld, and several experiments give the following results:

"1. It is not only possible to produce every variety of paper from the blades of Indian corn, but the product is equal and in some respects even superior to the article manufactured from rags.

"2. The paper requires but very little size to render it fit for writing purposes, as the pulp naturally contains a large proportion of that necessary ingredient, which can at the same time be easily eliminated if desirable.

"3. The bleaching is effected by an extraordinarily rapid and facile process, and indeed for the common light-colored packing paper the process becomes entirely unnecessary.

"4. The Indian corn paper possesses greater strength and tenacity than rag paper, without the drawback of brittleness, so conspicuous in the common straw products.

"5: No machinery being required in the manufacture of this paper for the purpose of tearing up the raw material and reducing it to pulp, the expense both in point of power and time is far less than is necessary for the production of rag paper.

"Count Lippe having put himself in communication with the Austrian Government an Imperial manufactory for Indian corn paper (*maishalm papier*, as the inventor calls it) is now in course of construction at Pesth, the capital of the greatest Indian corn-growing country in Europe. Another manufactory is already in full operation in Switzerland, and preparations are being made on the coast of the Mediterranean for the production and exportation on a large scale of the pulp of this new material."

Manufactures from corn-shucks.—A foreigner has filed his

application in Washington (with specimens) for a patent for various uses made of maize shucks. The varieties include yarn, maize cloth, paper of beautiful qualities (white and colored), from silk to parchment texture, maize flour, etc.

Soap it is said can be made from corn-shucks by pouring strong lye over them, boiling, taking out the strings, and supplying more material.

GRAMINACEÆ. (*The Grass Tribe.*)

Well known for their great value for many purposes.

Anthoxanthum odoratum, L. Probably imported; found near Savannah river, and around Charleston.

Mér. and de L. Dict. de M. Méd. i, 316 and 514. It has been used as a tonic and cordial. The fragrance, according to the analyses of Vogel, depends upon the presence of *benzoic acid.* Lind. Nat. Syst. 319.

This grass, as well as *Holcus odoratus*, contains *benzoic acid* (Wilson). It is thought to improve the quality of mutton. "From its dwarfy growth, and the close sward it forms, it is recommended to be sown on lawns or ornamental grounds." In Patent Office Reports on Agriculture, 1854, p. 22, some information is given concerning some of the best grasses for pasturage suitable to this country.

The spurry (*Spergula arvensis*) is introduced, but grows abundantly in our fields. In Germany and France it is much cultivated as a winter pasturage for cattle; mutton, as also the milk and butter of cows fed with it, are stated by Thaër to be of very superior quality. It is usually sown on stubble fields after the grain crops have been removed. "But the principal use to which this plant can be applied in this country is as a green manure on poor, dry, sandy, or worn out soils." See article cited. See, also, in Patent Office Reports, Agriculture, p. 187, an account of the couch-grass (*Triticum repens*), by C. E. Potter, of New Hampshire: "It is a stocky, hardy, sweet plant, and if properly cut and cured will command a higher price in the market where it

is known than the herds'-grass or timothy." Besides, it is easily propagated from roots on poor lands—even on pine plains. It is very difficult, however, to eradicate. The writer states that is heavier than any other grass when dried, and will produce more weight of fodder upon a given space.

The reader interested in the best grasses to be planted for hay to supply the loss of Northern hay can consult article on "Textile and Forage Crops," Patent Office Reports, 1855, p. 252. See, also, Patent Office Reports, 308, 1858, on the cutting and curing of hay. The Southern planter can here obtain information which may aid him in substituting native for the imported. There are two grasses planted in Holland that I think fit to cite here, as they may be made useful where drainage is employed, or banks formed to prevent the encroachment of water, viz: the sand or sea-side lime grass (*Elymus arenarius*), which Sir H. Davy found to contain one-third of its weight of sugar, hence called the "sugar-cane of Great Britain." It is too hard and coarse to be eaten by animals, unless cut up. "The purpose for which this plant is generally employed, and for which its creeping, matted roots fit it in an eminent degree, is for binding loose sands when sown with the sea-reed (*Arundo arenaria*), to prevent the encroachment of the sea. The world renowned dikes of Holland owe much of their strength and durability to the protection afforded by these remarkable plants." See Patent Office Reports, 1854, p. 26. We have two species of *Elymus* growing within the Confederate States. See article "After grass" in Wilson's Rural Cyc., for method of raising grass and hay to advantage, procuring a double crop, the combination of grasses, etc. Law's Practical Agriculture, and Loudon's Encyc. of Agriculture; Wilson's articles "Agricultural seeds" and "*Grasses*," "*Agrostis*," etc.; Sinclair's *Hortus Grameneus Wobernensis*, and Richardson's Essay on *Fiorin* (fiórin is produced from an aquatic grass, *Agrostis stolonifera longiflora*). *Alopecurus pratensis*, meadow or tall grass, which is found in the Confederate States, is much cultivated as a grass in Europe; it is much relished by horses and cattle. For wet

soils *Agrostis*, and the *Poa* can be cultivated with great advantage, furnishing the greatest yield. In England they plant a mixture of the most valuable grasses upon scientific principles, upon land ill adapted for any other product, using lime, etc. See article cited, also Rural Cyc., article "Barren soils," for plants best adapted to such soils. See, also, *Benzoin*." The *Agrostis stolonifera latifolia* (*Fiorin*) is considered by many in England as the best and most productive grass to sow on wet meadows; it is said to yield enormous crops, and it vegetates during the cold portions of the year. It has been a subject of much discordant opinion. See Richardson's Essay on Agriculture, and his Memoir on "Fiorin grass."

Wilson, in his Rural Cyc., article "Food of Animals," gives a list of the plants which are entirely avoided by all animals; also the leaves of certain trees and plants which can be used as substitutes for hay, when it is scarce, as follows: the leaves of elm, mulberry, ash, hornbeam; the lime trees (*Tilia*), the common maple and sycamore; the common acacia (*Robinia pseudacacia*); the willows, the poplars, the birches, beeches, plane trees, chesnuts, oaks, dogwood (*Cornus*); hazel (*Corylus*); furze (*Ulex*), and the vine are frequently used, he says, for this purpose on the Continent, in places where they happen to be plentiful. The green leaves of a tolerably large number of vegetables are annually cultivated on a large scale, either as food for man or for cattle, such as the leaves of maize, beet root, cabbage, carrot, parsnip, potato, and some others, all of which may be used for this purpose. *Op. cit.* So, also, the roots of a great many plants—the turnip, carrot, etc.

In our present difficulty of obtaining provisions for man and horse, many of these articles might be obtained by soldiers, detailed for the purpose from regiments in the service, particularly for the use of the cavalry horses. It is only necessary to know precisely what are the leaves or roots which are edible. See "*Zea*." Consult Rural Cyc., articles "Grasses," "Hay," "Hay-making," for much information on forage crops and grasses, etc.

Lolium temulentum, L. Bearded darnel, Ryle. Grain fields of North Carolina. (Chap.)

Johnston, in his "Chemistry of Common Life," vol. ii, classes this among the intoxicating substances that are liable to get mixed up with rye or wheat, and render it poisonous. It "creeps occasionally into our fermented liquors and our bread." It grows abundantly in corn-fields, and is cut with the grain. "They have been long known to possess narcotic and singularly intoxicating properties. When malted along with barley, which when the grain is ill cleaned sometimes unintentionally happens, they impart their intoxicating quality to the beer, and render it unusually and even dangerously heady. When ground up with wheat and made into bread they produce a similar effect, especially if the bread be eaten hot. Many instances are on record in which effects of this kind, sometimes amusing, and sometimes alarming, have been produced by the unintentional consumption of darnelled bread or beer. A recent case occurred, on Christmas day, 1853, at Roscrea, in Ireland, where several families, containing not less than thirty persons, were poisoned by eating darnel flour in their whole meal bread. They were attacked by giddiness, staggering, violent tremors, similar to those experienced in the *delirium tremens* produced by intoxicating liquors, viz: impaired vision, coolness of the skin and extremities, partial paralysis, and in some cases vomiting. By the use of emetics and stimulants, all were recovered, though greatly prostrated in strength. The narcotic principle in these seeds has not yet been discovered. When distilled with water they yield a light and a heavy volatile oil; but that the narcotic virtue resides in these oils has not yet been shown. No volatile alkali like the *nicotin* of tobacco has been detected in the water and oils which distilled over." Page 148.

Wilson, in his Rural Cyc., affirms the highly dangerous properties of the darnel. Its seeds being about the same size as wheat are often exceedingly difficult to be separated, and when they "find their way with the wheat into

bread flour they prove highly noxious to man, injuring his health, and sometimes producing delirium, stupefaction, and other symptoms of poisoning." "It fearfully deteriorates many samples of foreign wheat." I insert this, also, because many of these symptoms, caused by eating bad flour, have been ascribed to *ergot*. The people of whole provinces in France were affected, and a commission had to be sent to inquire into the cause, which was ascribed to *ergot*. See "*Ergot*," "*Ergotetia*."

Panicum dactylon, L. } Bermuda grass. Common
Digitaria " Ell. Sk. } in the low country; vicinity of Charleston. Fl. Aug.

Dém. Élém. de Bot. iii, 289. The root is used in the shape of a ptisan, as an aperient, and diuretic. The extract is said to purge like manna. It is eaten by dogs to procure vomiting. The plant contains a nutritive principle.

Panicum Italicum, Walt. Large-spiked panicum. Grows in ponds and damp soils; vicinity of Charleston. Fl. Sept.

Dém. Élém. de Bot. iii, 286. Detersive and mucilaginous; eaten by birds, but said to be injurious to man. Mér. and de L. Dict. de M. Méd. v, 182.

Phleum pratense, Linn. Timothy grass. Grows on Sullivan's island. It is supposed to be a valuable grass.

On the subject of substitutes for Northern hay, see "Cultivation of hay, cutting, and curing," Patent Office Reports, 1858, p. 308. Grass for hay should be cut at that period when the largest amount of gluten, sugar, and other matters soluble in water are contained in it. That period is not, generally speaking, when the plants have shot into seed, for the principal substance is then woody fibre, which is insoluble in water, and therefore unfitted for being assimilated in the stomach. It has been ascertained that when the grass first springs above the surface of the earth, the chief constituent of the blades is water, the amount of

solid matter being comparatively trifling; as its growth advances, the deposition of a more indurated form of carbon gradually becomes more considerable, the sugar and soluble matter at first increasing, then gradually diminishing, to give way to the deposition of woody substance, the saccharine juices being in the greatest abundance when the grass is in full flower, but before the seed is formed. Many of the natural pasture grasses—timothy grass (*Phleum pratense*)—are exceptions to this rule. The culms of the latter "are found to contain more nutritious matter when the seed is ripe than those of any other species of grass that has been submitted to experiment; the value of the culms simply exceeds that of the grass when in flower in the proportion of fourteen to five."

Holcus sorghum. Guinea corn; Indian millet, or doura corn.

This plant, a native of India, has been for a long time cultivated with great success on the plantations in South Carolina and Georgia, and it grows throughout the Southern states. The seed are produced in great abundance—they are pounded and eaten by the negroes, and are fed to poultry. The Guinea corn makes excellent brooms, and it affords one of the best materials to supply the demand, not only during the present difficulties, but, I trust, in the future also. A brief paper on its culture can be found in the Patent Office Reports, Agricult., 1854, p. 161, by N. T. Sorsby, of Alabama. The reddish-brown variety is much more prolific than the white, as it matures early. "The plant grows well on the poorest soils, and makes a good crop on our limestone rock, where there is enough of it disintegrated to support the stalk." It needs but little culture; after it gets a start it defies weeds and grass, and will make a crop in spite of every disaster. "It is sometimes cut green for soiling cattle and mules, and if properly done, so as not to injure the buds near the ground, it may be cut several times in a season. It is also cured and made into fodder or hay. The stalks are sometimes cut before frost

and put into barns, and then fed to stock. They remain green for months, and do not ferment nor spoil so soon as Indian corn or other grain." This plant will therefore serve as a substitute for Northern hay.

Sorghum vulgare, Pers. Doura corn. Cultivated.

It is said to yield a larger bulk of seed per acre than any other cereal grass whatever, not even excepting maize. It has a nutritive quality about equal to that of average samples of British wheat; it yields a beautiful white flour when crushed; and it may without any deterioration be mixed or ground up with wheaten flour, though it differs from wheat, and has some affinity to oats in containing a large quantity of *casein*. See Wilson's Rural Cyc. The broom-corn is *S. saccharatum;* the Guinea corn *S. cernuum*, Willd, according to Chapman's So. Flora.

Mr. N. P Walker, late principal of the Institute for the Blind, at Cedar Springs, near Spartanburg, S. C., writes word that brooms are manufactured in large quantities by the blind from broom-corn grown in the vicinity.

Sorghum saccharatum. Chinese sugar-cane. (*Sorgho sucré.*)

M. De Montigny, the French consul, introduced into Europe the Chinese sugar-cane. Its juice furnishes three important products, namely: sugar, which is identical with that of cane, alcohol, and a fermented drink analogous to cider. The density varies, and the proportion of the sugar contained in it, from ten to sixteen per cent., a third part of which is sometimes uncrystallizable. To this quantity of uncrystallizable sugar this juice owes its facility of readily fermenting, and "consequently the large amount of alcohol it produces compared with the saccharine matter, observed directly by the saccharometer." Climate makes a great difference in the amount of sugar this plant yields. "As the molasses, too, is identical with that manufactured from the cane, it may be used in the distillation of rum, alcohol, and the liquor called '*tapà*,' which resembles brandy. It will be remembered, too, that in the manufacture of brandy

or alcohol the uncrystallizable sugar can be turned to account, which in a measure would otherwise be lost. Another advantage consists in the pureness of the juice, which when thus converted, from the superiority of its quality can be immediately brought into consumption and use." The alcohol produced by only one distillation is nearly destitute of foreign flavor, having an agreeable taste somewhat resembling *noyau*, being much less ardent or fiery than rum. M. Vilmorin observes that the sugar is most abundant at the putting forth of the spikes, but the proportion of the sugar in the stalks continues to increase until the seeds are in a milky state. See Patent Office Reports, Agricult., 1854, p. 223. I have seen excellent molasses made from this plant in South Carolina by ordinary mills. The flavor and taste was equal to good quality of treacle, and it furnishes a most nutritious and useful food for negroes. In Patent Office Reports, 1855, pp. 280–284, are two statements by residents of New York and Pennsylvania on the planting of the *sorghum*, also a republication of Gov. J H. Hammond's early experience with it. The plant attains from ten to fourteen feet in height. I found that in the City of Charleston, on a bit of ground which was too wet to mature any vegetable, and subject to the tides, this plant grew to a great height, even when closely sown. I am convinced that it is particularly suitable to be planted as a substitute for hay, and particularly in lands even too wet for corn. It also grows well on high dry land. One of the writers just referred to thinks it will be of great benefit to every section of the country, "not only as a green feed during the hot months, but after being cut up and cured like the corn plant; its stalks may be steamed during the winter and given to horses, oxen, or cows, which will commence eating at one end and never leave them till entirely consumed."

Gov. Hammond had a rude mill put up with two beechwood rollers. Ten canes selected, the heads of which were fully matured, yielded three quarts of syrup. The juice tested by the saccharometer showed that the youngest had

rather the most and the oldest rather the least saccharine matter; he made syrup "equal to the best we could obtain from New Orleans." Lime-water of the consistency of cream was put to every five gallons of the cold juice. "A good sugar mill, with three wooden rollers, may be erected for less than twenty-five dollars, and a sugar boiler that will make thirty gallons of syrup a day, may be purchased in Augusta for less than sixty dollars." Since the period at which this was written, great improvements have been made in machinery, etc.

No doubt, sufficient cane for syrup, and tobacco for the use of negroes should be raised on every plantation. Syrup made by Mr. J. T. White, near Charleston, which I tasted, was as palatable as need be. Patent Office Reports, 1857, contain chemical researches by Prof. C. T. Jackson (p. 185) upon the *Sorghum*. It was also determined that the "Chinese and African sugar-canes, broom-corn, and doura are only varieties of a primitive species, the *Andropogon sorghum* of authors, or allowing the genus *Sorghum* to stand, *Sorghum vulgare*. These plants should not be allowed to amalgamate. The saccharine secretions of one variety will be diminished by cross fecundation with another not producing an equal amount; and the saccharine qualities peculiar to one may be lost by planting in a soil or climate differing from that which has brought them forth in unusual quality. If their cultivation as a forage crop, and a syrup and sugar-producing plant shall prove profitable, the use of the grain in the form of flour, as well as food for stock, may considerably diminish the cost of productions. Bost. Soc. Nat. Hist. Proc. Molasses and sugar are both powerfully antiseptic, and may be used in place of salt. Wilson states "that a comparatively small quantity of sugar, without any salt will, if applied to the muscular parts of the open fish, preserve salmon, cod, and whiting for several days, and impart to them no disagreeable taste." Rural Cyc.

Prof. J. Lawrence Smith, of South Carolina, in an examination of the sugar-bearing capacity of the Chinese sugar-cane, expresses himself with great moderation. He

reminds the reader that there are two well known varieties of sugar, viz: glucose, or grape sugar (a sugar moderately sweet, and difficult of crystallization), and cane sugar, with a very sweet taste, and easily crystallized. The first form occurs most abundantly in fruits, the latter in the sugar-cane, the beet root, the watermelon, maple, etc. Now the cane sugar is easily convertible into grape sugar, and in all processes for extracting the former, one important aim is to prevent this transformation. "For instance, were we to take the juice of the sugar-cane (containing about twenty per cent. of crystallizable sugar) and concentrate it, without subjecting it to the action of lime, or some other defecating agent, fully half of the sugar would be rendered uncrystallizable, and there would be only a small yield of sugar, but a large amount of molasses." So the impurities must be regarded which may give rise to the alteration mentioned, and the yield of sugar may depend upon the care and skill in working the juices. Dr. Smith then asserts that the juices of the cane deteriorate when kept, and advises that no time be lost after cutting in expressing the juice. By examining with polarized light (the most accurate method), the juice being previously clarified by acetate of lead, he says, "this result settles the question *that the great bulk of the sugar contained in the Sorgho is crystallizable or cane sugar proper*." The difference of opinion which has existed on this subject no doubt arose, it is added, from the fact that different degrees of care had been taken in the concentration of the juice, or that a more or less perfect process of defecation was resorted to. He used Soleil's polarizing saccharometer.

Dr. Smith then speaks of the processes for *separating the sugar*. Not successful with the method transmitted by Mr. Wray through the Patent Office, he prefers the following: warm the fresh juice rapidly to 120° F.; then add to each gallon of juice three ounces of lime, first slacking it with five or six times its weight of water, then bringing the temperature up to 200° It is then filtered, and carbonic acid passed through the juice, afterward filtered and evaporated to a proper consistency for crystallization.

Each time that the juice is filtered if it be allowed to pass through well washed animal charcoal, the syrup may be made very clear and the sugar prepared from it will be perfectly white. During the evaporation the temperature should at no time exceed 215° It often happens that we have days and even weeks for the crystallization to take place; but it may always be hastened by adding to the thick syrup when cool a few grains of brown sugar or a little pulverized white sugar. "It must not be forgotten that sugar making is an art, and cannot be practised by every one with a mill and a set of kettles; also, in extracting sugar from one vegetable, we are not to expect to apply successfully those methods practised on other vegetables. It was not by applying to the beet root the method of extracting sugar from the cane that France is now able to produce 120,000,000 pounds of sugar from that root. What was necessary for the beet root is doubtless required for the *sorgho*, viz: a thorough study of its nature, with a process of extracting the sugar specially adapted to it." Another observer, from Missouri, says that a proper mill for grinding the cane would consist of three cast iron rollers placed horizontally, so that the cane when passed through the mill would come out quite dry. Then a set of iron kettles made broad and shallow, ranged in a furnace so that evaporation might be accomplished more rapidly, would be a near approximation to the true method of grinding the cane and making molasses.

That the reader may appreciate some of the difficulties in the crystallization of sugar, and perhaps obviate them thereby, I will condense some passages from the article on "Sugar" in Wilson's Cyc. It applies as well to the problem of the sugar-producing powers of the *Sorghum:*

All acids have the effect of rendering sugar uncrystallizable. This is the case with citric, tartaric, and oxalic acids, which completely and forever destroy in sugar the property of crystallization. Alkaline substances also prevent the crystallization of sugar when mixed in excess. In the manufacture of sugar, therefore, from the expressed

juice of the cane, the beet, or any other sacchariferous plant, the quantity of sugar will be less, and that of molasses greater, whenever too much lime is used in the first purification of the juice. In pressing sugar-cane the juice which runs from the mill passes directly into a large boiler, in which, for purification, it is heated but not boiled with lime. The use of this alkaline earth has a twofold object—to neutralize the acetic acid which exists ready formed in the woody part of the cane and is pressed out by the mill together with the saccharine juice, and to clear this juice from various foreign matters mingled with it. By the application of gradual heat these impurities form a cake with the lime at the surface of the resinous liquid, which is drawn off clear and conveyed to the first boiler. After going through several successive boilers, in each of which it is boiled to a thicker consistence, it at length becomes a thick, dark syrup, when it is put into shallow, flat coolers. The molasses separates from it. In the very damp districts the cane yields no crystallizable sugar, when the whole of the juice is used in the manufacture of spirits.

Dr. J. Brown, in 1857, reported from the U. S. Agricultural Society as follows, concerning the *sorghum* canes: the yield of juice in weight of well trimmed stalks was about fifty per cent. The number of gallons of juice required to make a gallon of syrup varied from five to ten, according to the locality, the nature of the soil on which it was produced, and the succulent condition and maturity of the canes. In the province of New Brunswick it required ten to one; in the rich bottom lands of Indiana and Illinois about seven to one: and in the light lands of Maryland and Virginia five gallons to one of syrup [observe the effects of climate and latitude]. The yield of syrup per acre varied from one hundred and fifty to four hundred gallons. The amount of pure alcohol produced by the juice ranged from five to nine per cent. In cases where the plant was well matured and grew upon a warm, light soil, the juice yielded from thirteen to sixteen per cent. of dry, saccharine matter, from nine to eleven per cent. of

which was well defined, crystallized cane sugar, and the remainder uncrystallizable matter or *glucose*, but that taken from stalks obtained on rich low lands, luxuriant in their growth, yielded considerably less.

A palatable bread was made from the flour ground from the seeds of this plant, of a pinkish color, caused by the remnants of the pellicles or hulls of the seeds. By accounts from all parts of the country, this plant is universally admitted to be a wholesome, nutritious, and economical food for animals, all parts of it being greedily devoured in a green or dried state by horses, cattle, sheep, poultry, and swine, without injurious effects, the two latter fattening upon it equally well as upon corn.

Paper of various qualities has been manufactured from the fibrous parts of the stalk, some of which appears to be particularly fitted for special use, such as bank notes, wrapping paper, etc.

Prof. C. T. Jackson, in his chemical researches (p. 187, P O. Reports, 1857), found by experiment that "it was necessary to defecate the juice of the *sorghum* before setting it to ferment, otherwise the vinous fermentation sets in and converts all the sugar into lactic acid and *mannite*. Hence, when either vinegar, alcohol, or wine is to be made from the juice of this plant, it must first be clarified or defecated by lime and heat, and then filtered. When this is done the juice is readily made to undergo the vinous fermentation by the addition of a little brewer's yeast, and afterward the returns will serve for yeast to any quantity of the juice that it may be desired to ferment. I mention this because I know that many persons, unaware of the above named facts, have lost the sorghum juice they had endeavored to ferment both for vinegar and wine. At the proper temperature the sorghum juice will undergo the vinous fermentation in from three to five days." Dr. Jackson, though he does not supply the great desideratum, viz: a simple and clear method of obtaining the sugar, is convinced that both the Chinese and the African variety of the sorghum "will produce sugar of the cane type, perfectly

and abundantly, wherever the canes will ripen their seeds." He trusts that even the farmers of the Northern and the North-western states will not be discouraged. He says that if vacuum apparatus could be applied to this manufacture it would be far more sure to succeed, and "perhaps in the operations of a large farmer it may not prove an unprofitable investment to set up vacaum pans on his estate, expressly for sugar-boiling. If this cannot be done, we have only to caution the experimenters against burning the syrup, and to ask them to wait at least a week before they expect to see their sugar granulate."

The following is the plan recommended by Prof. Jackson in the "*Manufacture of sugar and syrup from the juice:*"

"Omitting as of no immediate practical value to the manufacturer the more refined processes which were employed in determining the amount of saccharine matter in the juice of this plant, I now describe a cheap and economical method of syrup and sugar making, which may be used by the farmer. In the first place, it is necessary to filter the juice of the plant as it comes from the mill, in order to remove the cellulose and fibrous matters and the starch, all of which are present in it when expressed. A bag filter, or one made of a blanket, placed in a basket, will answer this purpose. Next we have to add a sufficiency of milk of lime (that is, lime slacked and mixed with water) to the juice to render it slightly alkaline, as shown by its changing turmeric paper to a brown color, or reddened litmus paper to a blue. A small excess of lime is not injurious. After this addition the juice should be boiled say for fifteen minutes. A thick, greenish scum rapidly collects on the surface, which is to be removed by a skimmer, and then the liquid should again be filtered. It will be of a *pale*, straw color, and ready for evaporation. It may now be boiled down quite rapidly to about half its original bulk, after which the fire must be kept low, the evaporation to be carried on with great caution, and the syrup constantly stirred to prevent it from burning at the bottom of the kettle or evaporating pan. Portions of the syrup are to be

taken out from time to time and allowed to cool, to see if it is dense enough to crystallize. It should be about as dense as sugar-house molasses or tar. When it has reached this condition, it may be withdrawn from the evaporating vessel, and be placed in tubs or casks to granulate. Crystals of sugar will begin to form generally in three or four days; and sometimes nearly the whole mass will granulate, leaving but little molasses to be drained. After is has solidified, it may be scooped out into conical bags, made of coarse, open cloth, or of canvas, which are to be hung over the receivers of molasses, and the drainage being much aided by warmth, it will be useful to keep the temperature of the room at 80° or 90° Fahr. After some days the sugar may be removed from the bags, and will be found to be a good brown sugar. It may now be refined by dissolving it in hot water, adding to the solution some whites of eggs (say one egg for one hundred pounds of sugar) mixed with cold water; after which the temperature is to be raised to the boiling point, and the syrup should be allowed to remain at that point for half an hour; then skim and filter to remove the coagulated albumen, and the impurities it has extracted from the sugar. By means of bone-black, such as is prepared for sugar refiners, the sugar may be decolored by adding an ounce to each gallon of the saccharine solution and boiling the whole together; then filter, and you will obtain a nearly colorless syrup. Evaporate this as before directed, briskly, to half the bulk, and then slowly until dense enough to crystallize, leaving the syrup as before in tubs or pans to granulate. The sugar will be of a very light brown color, and may now be clayed or whitened by the usual method, that is by putting it into cones and pouring a saturated solution of white sugar upon it so as to displace the molasses which will drop from the apex of the inverted cone. The sugar is now refined as loaf-sugar. The methods here described are the common and cheap ones, which any farmer can employ. It may be advantageous when operations of considerable extent are contemplated to arrange a regular system of shallow evapo-

rating pans for the concentration of the syrup, similar to those now used in Vermont for making maple sugar. It is now evident that no ordinary methods can compete with those of a regular sugar refinery, where vacuum pans are employed, and evaporation is consequently carried on at a very low temperature. If the planter should raise sufficiently large crops to warrant the expense of such an apparatus on his farm, he would not fail to manufacture larger quantities of sugar, and to operate with perfect success in sugar-making; but this can be done only in the Southern, Middle, or Western states, where extensive farming is common. Those who wish to have their brown sugar clarified can send it to some of the large refineries, where the operation may be completed and the sugar put up in the usual form of white loaves.

"A very large proportion of our agricultural people will doubtless be satisfied with the production of a good syrup from this plant. They may obtain it by following the methods described in the first part of this paper, or they may omit the lime and make an agreeable but slightly acidulous syrup that will be of a lighter color than that which has been limed. This syrup is not liable to crystallize, owing to the presence of acid matter. The unripe canes can be employed for making molasses and alcohol, but, as before stated, will yield true cane sugar."

I am informed (1862) that the majority of cultivators in the Confederate States have remitted all exertions to make sugar from the African or Chinese sugar-cane. Their yield of syrup, however, proves highly acceptable and remunerative. The plants are largely grown, and tend measurably to remedy the scarcity of Louisiana sugars and molasses.

A cheap and good *vinegar* can be made from molasses: "To eight gallons of clear rain-water add three quarts of molasses; turn the mixture into a clean, tight cask, shake it well two or three times, and add three spoonfuls of good yeast or the yeast cakes. Place the cask in a warm place, and in ten or fifteen days add a sheet of common wrapping paper, smeared with molasses, and torn into narrow strips,

and you will have a good vinegar. The paper is necessary to form the 'mother' or life of the liquor." The scientific mode of making vinegar rapidly is to pass the liquor repeatedly through barrels filled with wood shavings; any sweet fruits, or roots, such as figs, beets, watermelon juice, etc., add to the bulk and quality; see "*Beta*" and "*Ficus.*" Sweet substances added to vinegar will increase the quantity when exposed to the oxygen of the air for the acetous fermentation to be effected. This is promoted by heat.

Mr. W. G. Simms writes me word (1863) that he made excellent *vinegar* during the past summer from both the May-apple and persimmon, thus: three bushels May-apple pulp, carefully crushed out of the sack, five gallons of molasses, three gallons of whiskey; this with thirty-five gallons of water made forty gallons of fine red vinegar. The persimmon makes a "beautiful white wine vinegar," thus: three bushels ripe persimmons, three gallons of whiskey, twenty-seven gallons of water.

The following was communicated to the Charleston Courier (1862) by C. Orr, of Mississippi:

"I find from experiments I have made that the seed of the sugar-cane (*Sorgho sucré*) parched and ground as coffee, prepared in the usual way, but by being boiled a little longer, make an excellent *substitute for coffee,* and my own impression is that if it was brought into general use thousands would adopt its use instead of coffee, even if coffee should again be offered at its former low prices, from the fact that all could grow and cultivate it with so little labor, and from its approaching so near to *the best Java.*"

Saccharum officinarum. Sugar-cane; cultivated in South Carolina, Georgia, Florida, and Louisiana; growing tolerably well in the lower portions of South Carolina. Its value is well known. The juice is said to be an antidote for poisoning by arsenic, and it might be temporarily substituted for the hydrated sesquioxide of iron.

In Agricultural Reports of the Patent Office, 1855, p. 268, there is a paper on the "Failure of the Sugar-cane in Louisi-

ana—proposed plan for restoration," etc. A brief history of the origin of the cane is given, and the varietes usually planted. The introduction of new plants by cuttings from British Guiana, or Venezuela, is advised, and the practice of rotation with certain specified plants, viz: wheat, the Chinese yam, the bitter and sweet cassada (*Jatropha*), and other fusiform roots, as well as the pea-nut, palma Christi, Bené, etc.

For sugar from canes, whether Chinese or African, consult DeBow's Review, and the Patent Office Reports, 1848, pp. 281 and 512, for long articles with plans, drawings, and a full description; also Olcott's work on the Imphee and Sorgho, with methods of grinding, crystallizing, etc., and translations from the French. In these all the processes are described for preparation of syrup, molasses, best varieties of cane, mode of culture, etc., etc. See, also, Gov. Hammond's contributions and experiments in "South Carolina Agriculturist," published by Mr. A. G. Summer, Columbia, S. C., 1856. These papers are too long to admit of their introduction here, and I content myself with directing the inquirer to the best sources of information. Wax is obtained from the surface of the cane by scraping. See Olcott's work for account of its collection in Algeria.

Oryza sativa. Rice. Cultivated extensively in the lower portion of South Carolina and Georgia, on the Cooper and Santee rivers.

U. S. Disp. 1268. The "seeds, being wholly free from laxative power, are adapted to cases of weak bowels, in which there is a strong tendency to diarrhœa." The decoction of rice water is very applicable, as a nutritive drink, to fevers, and inflammatory affections of the stomach, lungs, and kidneys. Rice starch is said to give "lawns and colored articles a look of newness unsurpassed." This plant is well known, and largely used as an article of food, and for exportation. See authors for references. Carolina rice was found by Bracconnot to contain 85.07 per cent. of starch, 3.60 gluten, 0.71 gum, 0.29 uncrystallizable sugar, 0.13 of

fixed oil. 4.80 veg. fibre, 5.00 of water, and 0.40 of saline substances. Dr. Wood (U. S. Disp.) discredits the opinion, expressed by some, that a rice diet produces injurious effects on the eyes—the condition of myope, for instance. During a residence of some years in both sections of South Carolina, my observations have been directed toward this point with special attention. I can safely assert that in the lower country of this state, where rice has long been a favorite article of food—the whites partaking of it every day, and in some form at almost every meal—the number of near-sighted individuals bears a proportion of at least ten to one over those residing in the upper districts, where it is well known that its use has only lately been generally introduced. So far as our experience goes, as well as that of many others, of whom inquiries have been made, scarcely an example can be found of it in the latter portion of the state, which is distinguished from the other by pretty accurately defined limits. If such a relation does exist between the quality of the ingesta and the greater convexity of the cornea, which further investigation and comparison must confirm or reject, it is exceedingly curious, there being as yet not even a hypothesis accounting for the *modus operandi*. It has also been indistinctly assumed to depend upon a long course of luxurious living in the ancestors; and another difference characterizing these divisions of the state tends to corroborate this opinion, and perhaps to throw some light on the existing disparity with respect to the power of vision. This is found in the fact that the seaboard of South Carolina was earliest settled by the Cavaliers and Huguenots, comprising many individuals of large means, who have for several generations been enabled to indulge in most of the comforts and luxuries of life. The case was otherwise with respect to the upper portions, where the inhabitants for some time lived necessarily in a more plain and frugal way. Any objections to the first ground, founded on the assertion that the negroes in the lower country are not affected in this way, may be anticipated by the reply that we seldom or never *know* when there is among them such defect in the

power of vision; and besides, they are in fact not generally furnished with rice as an article of food. The condition of things in Hindostan and China might throw some light on this question. I am informed by a gentleman in whose statements I put implicit confidence that rats infesting a granary where rice was stored were always found to be blind.

Bread is made of rice flour by the matrons of the Confederate States. "A quart of rice flour is made into a stiff pap by wetting it with warm water, not so hot as to make it lump; when well wet add boiling water, as much as two or three quarts; stir it continually until it boils, then add one pint of milk; when cool enough to avoid scalding the yeast, add half a pint of good yeast and as much wheat flour as will make it of a proper consistency for bread; put it to raise; when sufficiently risen it will be necessary to add a little more wheat flour. If baked too soft the loaves will be hollow. The bread must stand half an hour or more in a warm place after it is put in the baking pans, and it will rise again almost as much as it did at first. The same mixture, rather thinner, baked in muffin rings makes an excellent bread." (Southern Agriculturist, from a lady.) On the plantations of South Carolina much use is made of rice in this and other ways, and I have inserted the recipe among our other "resources" in times of war and blockade. See paper on culture of rice in P O. Reports, 1854, by Gov. R. F W Allston, of South Carolina; also article "Rice," Rural Cyc.

Parched rice has been used as one of the substitutes for coffee (see potato, *Convolvulus*). A correspondent of the Mobile Register, 1862, says that corn and rice mixed in equal parts, ground, and boiled, make an excellent substitute for coffee. As the grain of corn is harder than that of rice it needs more browning, and should be exposed to the heat a few moments before the rice is put in. The writer claims that "the beverage is equal to the best coffee ever drunk!"

Zizania aquatica. Canada rice; wild rice. Deep marshes and ponds; Florida, and northward. Chap.

This plant was experimented with by Sir Joseph Banks, by removing it from Canada to England in 1791. At first it could scarcely endure the climate, but gradually improved and became thoroughly acclimated. It became "in fourteen generations as strong and as vigorous as our indigenous plant." "It abounds in all the shallow streams of North America, feeds immense flocks of wild swans and other water-fowl, contributes largely to the support of the wandering tribes of Indians, and seems destined, in the opinion of Pinkerton, to become the bread-corn of the North. This grain has become acclimated in Middlesex, producing bland, farinaceous seeds, which afford a very good meal." Wilson's Rural Cyc. p. 30, art. "Acclimation." It would perhaps reward the trouble to experiment with this plant at the South, in order by cultivation to procure a new cereal. Consult, also, Dr. Macculloch on the Naturalization of Plants, Quarterly Journal of Science, vols. xxi and xxvi.

Leersia oryzoides, Swartz. Florida; Columbia; St. John's. This grass has been cultivated several years by Dr. S. Stuart at his summer residence near Pendleton. He expresses himself much pleased with it. It affords several cuttings through the season, and seeds late. Gibbes' Catalogue of Plants, Columbia, S. C.

Trichodium perennans, Ell. }
Agrostis perennans, Gray. } Walter's grass. Swamps and river banks; Florida; St. John's parish, S. C.

This was the grass which was cultivated by Mr. Walter and Mr. Fraser, who published a plate and description of it for the purpose of procuring subscribers in England and this country—the seeds to be furnished at two guineas a quart when five hundred subscribers should have been obtained. Mr. Thos. Walter, the author of the Flora Caroliniana, who resided at his place on the banks of the Santee, near Mexico, in St. John's, Berkley, thus speaks of it under his *Cornucopia perennans;* "*Gramen undique læve,*

saccharinum, æstatem sustinens, in hyeme vigens, radicibus geniculisque se cito propagans. Donum inæstimable, conditore ad hanc diem reservatum, hoc ævum, me instrumente, locupletarum!" Mr. Elliott says of it that "it is a fine, delicate winter grass, but never appears to grow vigorously enough for the scythe, nor will it bear, except in shaded or damp soils, the heat of summer. See notes to Prof. Gibbes' "Catalogue." The writer of this volume, in visiting the ancestral residence of Mr. Walter, noticed this grass still growing in close proximity.

Spartina juncea, Schreber, Ell. Sk. } White rush; rush-
Limnetis of some Bot. } like spartina. Grows in the salt water marshes; vicinity of Charleston; often immersed. Fl. Aug.

Dém Élém. de Bot. vi, 655. The flowers are purgative. The oil from the young branches is caustic, and is employed against ringworm, and in cutaneous eruptions generally. The leaves are pungent. "It has been proposed as a cultivated field plant for yielding fibre, and it would produce well on poor, silicious soils, which are unfit for flax or corn. Its manufactured fibre is clear, and as strong and soft as that of flax, but is deficient in length. The plant is of small value for forage." Rural Cyc.

Spartina glabra, Muhl. Cat. Salt marsh grass. Charleston; Newbern.

Ell. Bot. 96. This plant is greedily eaten by horses and cattle; and though it affords a good pasturage for out-door stock, yet it is remarkable for a strong, rancid, and peculiar smell, affecting the breath, the milk, butter, and even the flesh of animals that feed upon it. During the blockade of Charleston it has served as an important substitute for Northern hay; it is also valued as a manure.

Ammophila arenaria, } Reed bent-grass. North Carolina;
Calamagrostis. } sea-shore.

This plant (*Arundo arenaria*) is the most valuable for

planting on banks and on the sea-shore to prevent the encroachment of the water. It is planted in Holland for this purpose, and in Britain it is protected from destruction by law, on account of its great utility in enabling the sand to resist the action of wind and tide. *Elymus arenarius* is also protected in Scotland. (Wilson.)

Avena sativa. Oat. Cultivated in Confederate States.

See authors. Used as a food for horses. A gruel may be made of it, which is somewhat laxative, and which is employed in fevers.

Triticum. Wheat (gluten).

The best wheat for making bread is that containing the most gluten. That called Canada wheat in the United States has the highest rank; so Dr. Beck states in a paper on the subject of the value of breadstuffs, P O. Reports on Agriculture. And yet Chaptal asserts that the wheat of southern countries contains more gluten than that of northern. Chaptal says that the next grains in order, yielding gluten, are barley, rye, and oats. Gluten may be extracted, says Chaptal, from acorns, chestnuts, horse-chestnuts, apples, quinces, wheat, barley, rye, peas, and beans; from the leaves of the cabbage, cress, hemlock, lovage, and saffron; from the berries of the elder, the juice of the grape, etc. It is, however, contained in the greatest quantity in the grain of wheat, and it is from this that it is usually procured.

In order to extract gluten the flour of wheat must be kneaded into a paste with water; this paste must be afterward worked by the hand under a stream of water from a spout till the liquid flows off clear; the starch, sugar, and all the other principles contained in wheat which are soluble in water, are thus carried off, and there remains in the hands only a soft, elastic, glutinous, ductile, semi-transparent substance, adhering to the fingers after it has lost its moisture, and exhaling an animal odor; this substance is called gluten, or the *vegeto-animal principle.* There

are some very nutritive vegetables, the author adds, in which the starch instead of being combined with gluten, as it is in the bread corns, is united with mucilage; this is the case with peas, beans, and potatoes. The flour of these will not alone make bread, but it is frequently used in years of scarcity, mixed with that of wheat to increase the quantity of bread. It is not unusual in the domestic economy of our plantations to have excellent bread by combining the sweet potato (*Convolvulus*) with wheat flour. An agreeable, sweet taste is thus imparted to the bread.

The wheat used in making starch in England is either entire or coarsely bruised, and is steeped in cold water till it swells and yields by pressure a milky juice; it is then subjected to pressure in coarse bags placed in vats filled with water. When all the milky juice is expressed, the bags are removed, the fecula gradually subsides to the bottom, and the supernatant liquid soon ferments and suffers a resolution of the principles dissolved in it into alcohol and acetic acid. The whole, after fermentation, is poured into tubs called frames, and after the fecula subsides in these, the supernatant liquid is poured off—the upper part of the sediment, being dirty and discolored, is scraped off—and the rest of the sediment, constituting the main bulk and purest portion of the fecula, is repeatedly well washed, pressed in cloths, and dried by a gentle heat; during the process of drying it so contracts as to form itself into the somewhat regular, small, six-sided columns in which it is sold in the shops. In this comparatively pure state it is of course less suited as an aliment than sago, arrow-root, etc. Wilson's Rural Cyc. Consult, also, Ure's Dict. Arts. In South Carolina wheat flour starch is preferred to that procured from the potato. Rice makes an excellent starch. Parched wheat, rye, and corn have been used, as was said, as substitutes for coffee. The following is offered by a contributor to a newspaper:

"*The best substitute for coffee, and a practical receipt for its preparation.*—Take rye, boil it, but not so much as to burst the grain, then dry it either in the sun, on a stove, or a

kiln, after which it is ready for parching, to be used like the real coffee bean. Prepared in this manner it can hardly be distinguished from the genuine coffee. The rye when boiled and dried will keep for any length of time, and consequently can be done at some convenient moment, so as to have it ready whenever wanted for parching."

Ctenium Americanum, Spreng. } Low pine barrens; Flor-
Monocera aromatica, Ell. } ida to North Carolina.
The root of this grass is aromatic and highly pungent.

Glyceria fluitans. *Poa* of Ell. Sk. } Floating sweet
Festuca of Linn. } meadow-grass; water fescue. Grows in the upper districts; Newbern. Fl. Aug.

Dém. Élém. de Bot. iii, 307 It furnishes a species of manna. Wilson states that it will yield a considerable produce even on common undrained land. It constitutes a valuable forage for animals. Its seeds form a common and enriching food for fresh water fish, for aquatic fowl, and when gathered and dried they constitute the manna-croup of the shops, and are extensively used as an agreeable and highly nutritious material for soups and gruels. The seeds are shaken out over pieces of cloth. Rural Cyc.

Poa compress, L. True blue grass. (*P. pratensis* of others. Both good grasses; growing in Florida, and throughout the Southern states.)

It is considered, says Dr. Lee, editor of the Southern Field and Fireside, March 8, 1862, as the plant the very "best adapted to stop washing and store up fertilizers in their growth, for feeding stock, and yielding rich manure." It does not require replanting, and grows well on poor granite hills. It prevents all abrasion of the turf by the heaviest rains. It is also not difficult to subdue with the plough. "It makes a good sod and very fertilizing turf, and thus fattens the land, and fattens all kinds of farm stock." These perennial grasses enrich the land more

than forest trees, because "they approximate grain and flesh in their chemical composition more than forest leaves. Cattle that will starve on oak and pine leaves will wax fat on blue grass." See, also, "Southern Homestead." See Dr. Lee's editorials in Southern Field and Fireside, 1861, for much information on the grasses best to be used as fertilizers and for food and manure. He recommends the "tall oat grass" (*Arrhenatherum avenaceum*) and the Texas mesquit grass (*Holcus lanatus*) introduced from England, called also velvet grass and white timothy. The "Bermuda grass" is very pertinacious, and is excellent in eradicating nut-grass.

Among the grasses useful for *hay* are the herds'-grass, timothy, orchard, and clover. See, also, Southern Field and Fireside, May 4, 1861, for article on "Stalks of corn as substitutes for hay."

Wilson states that the juice of the upright variety of *Poa* consists almost entirely of pure *mucilage.* Rural Cyc. Consult papers on the "Grasses," "Hay," etc., Sinclair's Hortus Gramineus Woburnensis, Loudon's Encyclopædia, etc., for full account of the relative value of grasses. Salt is often mixed with hay which has become wet, as a restorative; it is then much relished by cattle.

Festuca duriuscula, L. Fescue grass. Introduced.

Several species of *Festuca* grow within the limits assigned to me. See botanical authorities. Wilson's Rural Cyc. states that this is one of the best of the native grasses of England for general utility. It thrives there on widely different kinds of soil, yields a moderately large bulk of produce, maintains much of its verdure in winter, and resists the usual withering effects of excessive drought and heat in summer. It is well adapted by its winter verdure and fine foliage for forming the sward of parks and the herbage of ornamental sheepwalks; and when raised on a thin, healthy soil, or on poor, silicious sand, it has culms of so very fine and slender a form as to appear well suited to the straw hat manufacture. See *op. cit.* and the Woburn Ex-

periments. This grass would likely be serviceable when planted on sands subject to inundation.

Arundinaria gigantea, macrosperma, Mx. Cane. Banks of large rivers; Lauson in his Travels in Carolina says it does not grow north of James river; confirmed by Nuttall. Croom's Cat.

The cane and reed (*A. tecta*, Muhl) are well known and used for many purposes: sometimes slit and made into chair bottoms, weavers' shuttles, and wherever a round, hollow wood is required for cheap tubing, etc. The canes attain a great height and size on our river courses, and are a characteristic growth; they once grew luxuriantly throughout the upper country of South Carolina and Georgia, whence the names of the creeks and rivers, but have been almost entirely consumed by animals. See, also, the "History of the upper country of South Carolina," by my friend, Jno. Logan, Ch. 1860.

Bromus secalinus, W Chess. Dr. McBride found it in St. John's, Charleston district. Fl. July.

Flora Scotica, 1087 This is the plant which is said to render the seeds of wheat bitter. Mér. and de L. Dict. de M. Méd. i, 672; Journal Gén. de Méd. lxxxviii, 82; Shec. Flora Carol. 297 A good green dye is extracted from the flowers. Griffith, Med. Bot. 662. M. Cordier finds that it is bland in its action; it was once thought to possess purgative powers.

Bromus purgans, L. Cathartic bromus. Mountains of S. C. Fl. August.

Mér. and de L. Dict. de M. Méd. i, 672. It was said to be anthelmintic, and that forty grains would produce vomiting. Effect uncertain.

Dactylis glomerata, Linn. American orchard-grass; clustered dactylis. James' island, near Charleston. Fl. July.

Shec. Flora Carol. 492. This is the species instinctively

sought after and swallowed by dogs and cats when they are inclined to vomit, or to envelop the splinters of bone collected in their stomachs. "It is a valuable grass, and ought to be cultivated with care."

CYPERACEÆ. (*The Sedge Tribe.*)

They contain very little fecula or sugar.

Cyperus articulatus, Mich. Jointed cyperus. "Grows on Hilton Head island, at Ogeechee," Ell.; vicinity of Charleston. Fl. July.

Mér. and de L. Dict. de M. Méd. ii, 567. In Guinea this is considered one of their remedies for worms.

Cyperus odoratus, L. River banks; vicinity of Charleston. Fl. August.

Lind. Nat. Syst. Bot. 385. The root has a warm, aromatic taste, and the infusion is given in India as a stomachic. Ainslie, Mat. Med. Ind. 288.

Cyperus virens, Mx. Sharp grass. If incautiously drawn through the hand the stem will cut severely with its sharp angles.

Cyperus hydra, Mx. Nut-grass. St. John's; Newbern. Prof. Holbrook informs me that Gen. Pinckney told him it was introduced, though Elliott does not mention it. Its reproductive power is marvellous, and hence it is a great scourge to the planter, depreciating the value of land. It is with difficulty eradicated by constant hoeing; by this process in its constant efforts to throw its leaves to the light the root becomes exhausted. The experiment has been successfully tried by J. McQueen, Esq., of Georgia, Ell. The destruction of the seeds is also thus secured.

Scirpus maritimus, L. } Maritime *Scirpus*. Marsh-
" *macrostachyus*, M. } es; "Little Ogeechee bridge, seven miles from Savannah," Ell. Collected in St. John's; vicinity of Charleston. Fl. June.

Dém. Élém. de Bot. ii, 292. Aromatic, and slightly nutritive.

Eleocharis palustris, R. Brown. } Bog maritime
Scirpus " Linn. and Ell. Sk. } *Scirpus*; marsh club-rush. Grows in rice fields, often immersed. Collected in St. John's; vicinity of Charleston. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 262. Lemery says the roots are astringent, and that they are employed in decoction in diarrhœa and hemorrhage. It is much used in Europe in the manufacture of chairs, mats, and delicate work, and I would invite the attention of those engaged in similar operations in this country.

Carex acuta, L. Grows in bogs in the upper districts, often immersed, Lightfoot; Newbern. Fl. April.

Fl. Scotica, ii, 566. In Italy the leaves are used by glass-makers to bind their wine flasks, and in the manufacture of chair bottoms; also by coopers to place between the seams of cask heads to render them air-tight. The *Typha latifolia* and *Scirpus lacustris*, both found in the Confederate States, have been used for this purpose. (See these plants.) The makers of turpentine barrels might find them convenient and valuable, supplying the place of the strip of wood shaving I have seen some of them employ.

Class IV RHIZANTHS.

Class V. ACROGENS, OR FLOWERLESS PLANTS.

In this volume I pass over very lightly the *Cryptogamia, Filices, Lichenes, Musci, and Algæ*, the ferns, lichens, mosses, etc., referring the reader for full details to my report before the Am. Med. Assoc. vol. vii, on the "Medicinal, Poisonous, and Dietetic Properties of the Cryptogamic plants of the United States," a volume of 126 pages.

The leaves of ferns, one of the subdivisions of this class, generally contain a thick, astringent mucilage, with

a little aroma; on which account they may be considered pectoral and lenitive. Lindley states that almost any of them may be substituted for the *Adiantum pedatum*, and *A. capillus veneris*, which especially abound in these products. I have observed in the leaves of the *Osmunda regalis*, and of several other species, a taste strongly resembling that of *spermaceti*.

EQUISETACEÆ. (*Horsetail Tribe.*)

Equisetum lævigatum. Horsetail. North Carolina, and northward. The seeds of the horsetail are remarkable for hygrometrical movement. They contain a great deal of silica. The dried stems of *E. hiemale* and *E. arvense* are imported from Holland for cleaning wooden utensils and polishing cabinet work, turnery, and metallic wares. "This plant might be profitably cultivated for the use of turners, cabinet-makers, and other artificers." Wilson's Rur. Cyc.

POLYPODIACEÆ.

Pteris aquilina, L. Brake. Grows in damp pine lands; sent to me from Abbeville district by Mr. Reed; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Dem. Élém. de Bot. iii, 347 The root is vermifuge and astringent; and is said to be a remedy for the tape-worm, one ounce of the decoction being used at a dose. This plant contains a very large proportion of alkali. Fl. Scotica, 656. Its ashes will yield double the quantity of salt afforded by any other plant—forming, therefore, a manure adapted to potatoes. Made into balls with water, it is employed to wash linens. The astringency is so great as to render it useful in preparing leather and kid gloves.

Wilson, in his Rural Cyc., says that the main interest in British ferns is concentrated in the *Pteris*, and as it is abundant in the Confederate States, I will condense his remarks: it was formerly, he says, in great request for thatch, and usually lasted in that capacity eight or nine years on the north side of a roof, and fifteen or sixteen years on the south side; but, except in the meanest hovels, it has been super-

seded by heath, straw, tiles, and slates. It was formerly used in considerable quantity in both the glass and the soap manufactory, but cheaper and better articles have since supplied its place; still, in the Confederate States we may find it useful as a material for a supply of potash and in making lye. The plant also possesses tannin. It is used as a fuel for heating ovens and burning lime; it forms good litter to protect esculent roots in pits during winter. In England the rank growth of the brake is destroyed by irrigation.

The *Adiantum pedatum*, L., maiden hair, yields a useful syrup, called by the French "capillaire," which is a refreshing beverage mixed with water in fevers. Farmer's Encyc.

OSMUNDACEÆ.

Osmunda regalis, Mx. Royal fern; flowering fern. Grows in damp soils; collected in St. John's. Fl. July.

Wade's Pl. Rariores, 87 Dr. Stokes says that impressions of this fern are observed in nodules of iron-stone in the Colebrookdale iron-works, and that it is the only species of an indigenous (European) vegetable which has ever been found in a fossil state, all others being of American growth. Withering, Supplem. to Mér. and de L. Dict. de M. Méd. 1846, 536. It is sometimes employed in dropsy, as an astringent in injuries, and by Dr. Heidenreich in the radical cure of hernia; he reports fifty cases ("guéris radicalement") after the method of Simon: giving the root in wine internally, and placing upon the hernial ring compresses which have imbibed the decoction of the plant. Journal de Chim. Méd. viii, 395, second series, 1842. In the Dict. Univ. de M. Méd. v, 113, its employment in this affection was spoken of. Hermann boasts of it as having a direct action upon the intestinal canal ("bas ventre"), which it purges mildly in doses of two to four drachms of the powder. It acts upon the bile, augments digestion, and strengthens chylification. The extract has been thought peculiarly suited to cases of children affected with caries, mixed in milk or water, and continued for some time. Aubeil's Obs.

sur l'emploi de l'Osmond, Journal Gén. de la Soc. de Méd. xlvi, 59, 1843. Lindley, in his Nat. Syst. Bot. 400, states that it "has been employed successfully in doses of three drachms in the rickets." The leaves have been selected to make cradles for delicate children, from some supposed good effects derived from their use. Encyclop. Meth. Botanique, iv, 652. The strong resemblance which I have noticed between the taste of this species and *spermaceti* is quite marked. The plant seems scarcely to be known in this country, and I observe no notice of it in the American works.

ALGÆ. (*Inarticulatæ.*)

Fucus serratus and *F. vesiculosus.*—*Iodine* exists most abundantly in most species of *Fucoideæ,* which form the greatest part of the sea-weeds of our coast. I extract the following from Wilson's Rural Cyc., in order that so useful a substance may be made in the Southern Confederacy, and also refer the reader to the plants furnishing iodine, which are treated of in my paper in the seventh volume Am. Med. Assoc. Iodine also occurs in the sponge, and in many moluscous animals. But it is from the incinerated sea-weed or kelp that the iodine in large quantities is obtained. As the soap manufacturers are in the habit of obtaining their soda from kelp, iodine may be procured very economically from the residuums of their operation, according to the process invented by Dr. Ure, which is as follows:

The brown iodic liquor of the soap-boiler, or the solution of kelp from which all the crystallizable ingredients have been separated by concentration, is heated to about 230° Fahr., poured into a large stone-ware basin and saturated with diluted sulphuric acid. When cold the liquor is filtered through woollen cloths; and to every twelve ounces (apothecary's measure) is added one thousand grains of black oxide of manganese in powder. The mixture is put into a glass globe or large matrass, with a wide neck, over which a glass globe is inverted, and heat is applied, which causes the iodine to sublime copiously, and to condense in the up-

per vessel. As soon as the balloon becomes warm another is substituted for it; and when the second becomes heated the first is again applied. The iodine is withdrawn from the globes by a little warm water, which dissolves it very sparingly; and it is purified by undergoing a second sublimation. The test made use of for the detection of iodine in any solution is, it is well known, starch; sometimes a few drops of sulphuric acid should be added, and a blue color is obtained if iodine be present. See Rural Cyc., Ure's Dict., and works on chemistry and mat. medica.

Kelp is obtained from the two *fuci* mentioned above, from which also soda is obtained. I will insert the process as given by Wilson, in order that it may be better known by those living on our coasts. He says that on the Scottish coast the sea-weed is cut close to the rocks during the summer season, and afterward spread out upon the shore to dry, care being taken to turn it occasionally to prevent fermentation. It is then stacked for a few weeks, and sheltered from the rain, till it becomes covered with a white, saline efflorescence, and is now ready for burning. This is usually accomplished in a round pit lined with brick or stone; but the more approved form for a kiln is oblong, about two feet wide, eight to eighteen long, and from two to three deep. The bottom of this is covered with brush, upon which a little dried sea-weed is now thrown gradually as fast as the combustion reaches the surface, and should there be much wind it is necessary to protect it by covering the sides with sods; after the whole is burnt the mass gradually softens, beginning at the sides, when it should be slowly stirred up with a heated iron bar, and incorporated till it acquires a semifluid consistence. This part of the process requires considerable dexterity, and if the mass continues dry a little common salt should be thrown on, which acts as a flux. When cold it is broken up, and is now ready for sale. Notwithstanding, the author adds, that kelp contains but two or three per cent. of carbonate of soda, while Spanish barilla often contains twenty or thirty [see "*Salsola*" and "*Salicornia*"],

the manufacture of this article during the Continental war increased prodigiously. Stones were placed within the flood-mark of sandy shores, which became covered with sea-weed. Potash will often supply its place, but soda is indispensable to the making of plate and crown glass and all hard soaps. The barilla is obtained in France from *Salicornia annua*, which yields fourteen per cent. of soda. In the Confederate States we have species of all the genera yielding soda and potash, viz.: *Salsola*, *Salicornia*, *Statice*, *Atriplex*, and *Chenopodium*, all embraced under the family *Chenopodiaceæ.*

"Sea-ware," or sea-weed, cast upon the shores is largely collected and used as manures. They contain a large proportion of nitrogenous and saline matters, with earthy salts in a readily decomposable state. They also contain much soluble mucilage.

FUNGI, OR FUNGACEÆ. (*The Mushroom Tribe.*)

There are many species among these allowed the possession of medicinal virtues of a high order as well as of great value in the arts, and a rich field is open to the investigator in these interesting departments of natural history and indigenous medical botany. I am compelled to refer the reader for details to the paper before mentioned.

Agaricus campestris. Edible mushroom.

The reader will find in my report to the American Med. Association, vol. vii, 1854, on the Medicinal Properties of the Cryptogamic Plants of the United States, a full and elaborate account of the edible, poisonous, and medicinal fungi. See, also, Roques' treatise, "Champignons Comestibles," Paris. I introduce portions of a paper from the Patent Office Reports, 1854, on the mode of cultivation of the mushroom:

"The kind most generally cultivated in the gardens is the '*Agaricus campestris*,' which is thus described by McMahon: 'The gills of this are loose, of a pinky red, changing

to liver color in contact but not united with the stem: very thick-set, some forked next the stem, some next the edge of the cap, some at both ends, and generally in that case excluding the intermediate, smaller gills. Cap white, changing to brown when old, and becoming scurfy, fleshy, and regularly convex, but with age flat and liquefying in decay, flesh white, diameter commonly from one inch to three, or sometimes four or more. Stem solid, one to three inches high, and about one inch in diameter.' Loudon says 'The mushroom is a well known native vegetable, springing up in open pastures in August and September. It is most readily distinguished when of middle size by its fine pink or flesh colored gills and pleasant smell: in a more advanced stage the gills become of a chocolate color, and it is then more apt to be confounded with other kinds of a dubious quality; but that species which most nearly resembles it is slimy to the touch, and destitute of the fine odor, having rather a disagreeable smell. Further, the noxious kind grows in woods or on the margin of woods, while the true mushroom springs up chiefly in open pastures, and should be gathered only in such places.' Armstrong gives the following directions for cultivating the garden mushroom: 'Prepare a bed early in October, either in a corner of the hot-house, if you have one, or a dry and warm cellar. The width of the bed at the bottom should not be less than four feet, and its length in proportion to the spawn provided. Its sides should rise perpendicularly one foot, and should afterward decrease to the centre, forming four sloping surfaces. We need hardly say that the material of the bed at this stage of the business must be horse-dung, well forked, and pressed together, to prevent its settling unequally. It should then be covered with long straw, as well to exclude frost as to keep in the volatile parts of the mass, which would otherwise escape. After ten days the temperature of the bed will be sufficiently moderated, when the straw is to be removed, and a covering of good mould to the depth of an inch laid over the dung. On this the seed or spawn of the mushroom (which

are threads or fibres of a white color, found in old pasture grounds in masses of rotten horse-dung, sometimes under stable floors, and frequently in the remains of old hot-beds) is to be placed in rows six inches apart, occupying all the sloping parts of the bed, which is again to be covered with a second inch of fresh mould and a coat of straw. If your bed has been well constructed your mushrooms will be fit for use at the end of five or six weeks, and will continue to be productive for several months. Should you, however, in the course of the winter find its productiveness diminished, take off nearly all the original covering, and replace it with eight or ten inches of fresh dung, and a coat of clean straw. This by creating a new heal will revive the action of the spawn, and give a long succession of mushrooms.' The garden mushroom is eaten fresh, either stewed or boiled, and preserved, as a pickle, or in powder, or dried whole. The sauce commonly called 'ketchup' is or ought to be made from its juice with salt and spices. Wild mushrooms from old pastures are generally considered as more delicate in flavor and more tender in flesh than those raised in artificial beds. But in the young or butter mushrooms of the cultivated mushrooms there is evidently much less risk of deleterious kinds being employed. The soil employed should be virgin earth with turf well reduced, neither too dry nor too wet, otherwise it will not be capable of being beaten solid. It must be laid regularly over the beds, two inches thick. From the time of earthing the room or cellar should be kept at a temperature of 50° to 55° Fahr. If higher it will weaken or destroy the spawn; if lower it will vegetate slowly, and if watered in that state numbers of mushrooms will be prevented from attaining perfection. Water must be applied with extreme caution, being nearly as warm as new milk, and sprinkled over the beds with a syringe or small watering pot. Cold water destroys both the crop and the beds. If suffered to become dry it is better to give several light waterings than one heavy one. Beds thus managed will bear for several months, and a

constant supply kept up by earthing one bed or more every two or three months. If when in full bearing the mushrooms become long stemmed and weak the temperature is certainly too high, and air must be admitted in proportion as the beds decline. To renovate them the earth must be taken off clean; and if the dung is decayed the dung must be reformed, any good spawn being preserved that may appear; but if the beds be dry, solid, and full of good spawn, a fresh layer of compost three or four inches thick may be added mixed with a little of the old, and beaten solid as before."

Mushrooms may be grown in a cellar or other vaulted place with equal success, and not unfrequently with a greater advantage, the same rules being adopted; but no fire is necessary, and less water. Antidote to poisonous sorts: all fungi should be used with great caution, for even the edible garden mushrooms possess deleterious qualities when grown in certain places. All the edible species should be thoroughly masticated before taken into the stomach, as this greatly lessens the effects of poisons. When accidents of this sort happen, vomiting should be immediately excited, and then the vegetable acids should be given, either vinegar, lemon juice, or that of sour apples; after which give ether and antispasmodic remedies to stop the excessive bilious vomiting. Infusions of gall-nuts, oak bark, and Peruvian bark are recommended as capable of neutralizing the poisonous principle of mushrooms. It is, however, the safest way not to eat any of the good but less common sorts until they have been soaked in vinegar. Spirits of wine and vinegar extract some part of their poison; and tannin matter decomposes the greatest part of it.

The following is a method of raising mushrooms by a gentleman, "R. C.," of Beaufort, S. C., which I obtain from an agricultural paper. "I send you a method of raising mushrooms, by which I have very unintentionally succeeded in producing an abundance each spring for the past three years, and sometimes during the winter and fall: fence in a spot; strew litter or trash from the woods in it, say one or

two inches thick, and shut up stock cattle in it every night for a week or two any time between January and June. Let the manure remain untouched, and in the fall or winter, if the weather proves mild, an abundance of mushrooms will be produced, which may be eaten without any fear, as only edible ones will grow."

A discovery was made some few years since that two or three species of agaricus, form by deliquescence an inky fluid which dries into a blister colored mass, is capable of being used as a water color for drawing, and retains its color in defiance of all the common chemical agencies. Dr. Coxe, of America, who put the discovery completely to the test, is disposed to think that the deliquescent fungi might be prepared into an excellent India ink; that its dried deposit, mixed with oil, might probably answer for engravings, and that as the ink appears to be indestructible by any agency short of burning, it might be tried for the filling up of bank notes and other valuable papers. The kinds of agarici which possess the inky property appear to be those designated *ovatus*, *cylindricus*, and *porcellaneus*. It is this property of blackening which enables us to separate the poisonous from the edible. Wilson's Rural Cyclop. See my report Am. Med. Assoc., vol. vii, on Medic. Edible and Poisonous Prop. of Cryptogamic Plants of the United States.

The Patent Office Reports, 1854, contain papers on the cultivation of the garden mushroom from Armstrong, Loudon, and others.

Uredo segetum and *U. fetida.* *Smut* in wheat and corn is prevented by soaking the grains before planting for twelve hours in a solution of lime-water, salt and water, or acids. The taste and smell of smutted wheat is disguised by molasses, hence it is often purchased by those making sweetened bread. See a full description in Wilson's Rural Cyc.

Œcidium, *Uredo*, *Puccinia*, *etc.* Minute parasitical fungi; attacking fruit trees, plants, etc. See article in Rural Cyc.,

and my report on Medical and Poisonous Properties of the Cryptogamic Plants of United States, Trans. Am. Med. Assoc. vol. vii: also, H. W Ravenel's *Fungi Carolin. Exsicati;* Loudon's Encyc. of Plants; Sowerby's English Fungi, and Berkely's Crypt. of England.

Lycoperdon solidum. Tuckahoe; Indian bread or Indian loaf. I have collected it in the fields, St. John's, S. C. It is not mentioned by Chapman.

This subterranean root or fungus has been described by Clayton and LeConte, and by Dr. McBride, of South Carolina, in a communication to the N. Y. Philosoph. Society. See, also, Med. Report, vol. vi, and Farm. Encyc. It is very probably nutritious. Its internal color is white; it resembles a brown loaf of coarse bread.

I am instructed to append the following formulæ:

In coughs, with bronchial or pulmonary irritation:

℞—Tinct. Sanguinariæ...f℥j.
Tinct. Opii............f℈ij.
Vini Ipecacuanhæ...f℈vj.
Syr. Tolutan. ....f℥ij.

Ft. Mist. Xxx or xl gtts. three or four times a day.

If much inflammatory action be present the following preferred:

℞—Tinct. Sanguinariæ..f℥i.
Morph. Sulph.....gr. iss.
Tinct. Digitalis.
Vin. Antimon....a af℥ss.
Ol. Gaultheriæ...gtts. x.

Misce. From xx to xl drops twice or thrice daily.

In general anasarca, with debility:

℞—Juniperi Fructi...℥ij.
Potass. Nitrat....℥ss.
Vini Albi.........o ij.

Macerate for twelve hours; dose two tablespoonfuls twice a day.

Ayer's Cherry Pectoral:

℞—Morph. Acetat..................gr. iij.
Tinct. Sanguin. Canaden.........ʒij.
Vin. Antim. et Potass. Tart.
Vin. Ipecacuanhæ.............a aʒiij.
Syrup. Pruni Virginiani.........℥iij.

In chronic bronchial disease:

℞—Tinct. Cimicifugæ Racemosa.
Tinct. Sanguinariæ.........a a℥j.
Morphiæ Sulph............gr. ij.
Syr. Acaciæ....................℥ij.

Ft. Mist. Dose, one teaspoonful when the cough is urgent.

In lithic acid diathesis:

℞—Liquor Potassæ......f℥ss.
Tinct. Humuli......f℥iss.
Infusi Columbæ.....f℥iv.
Syrup. Aurantii......f℥ij.

Ft. Mist. Dose, one tablespoonful twice or three times a day.

Excellent alterative and cathartic pills, used with advantage in all glandular diseases, in anasarca, and in hepatic derangement:

℞—Extracti Podophylli..ʒj.
Ext. Aloes Hepat...ʒiij.
Gambogiæ..............ʒj.

M. Ft. pilulæ, lx.

Cathartic pills:

℞—Extracti Podophylli......ʒij.
Hydrarg. Chlorid. Mitis..ʒj.
Ol. Cajuputi ....gtts. vj.

M. Ft. massa. in pilulas, lx div.

May be prescribed in cases in which blue mass or mild mercurials are indicated:

℞—Podophyllin......gr. xv.
Zinziberis Pulv......ʒss.
Ext. Gentianæ.......ʒss.

M. Ft. mass. in pilulas, xxx dir.

A mild laxative and alterative:

℞—Podophyllin...... ʒj.
Sacchari Albi..ʒxix.

Triturate and mix thoroughly. Dose from v to x grs.

Aperient, in torpor of bowels proceeding from hepatic derangement:

℞—Tinct. Sanguinariæ.
Tinct. Aloes Comp. a af℥ij.

Ft. Mistura. Dose, from xx to xxx drops twice daily.

Laxative, in habitual costiveness:

℞—Sanguinariæ Pulveris.
Rhœi Pulveris..a aʒj.
Saponis............℈ij.

Mix with water. Div. in pilulas xxxij. One pill morning and night.